US007954064B2

(12) **United States Patent**
Forstall et al.

(10) **Patent No.: US 7,954,064 B2**
(45) **Date of Patent: May 31, 2011**

(54) **MULTIPLE DASHBOARDS**

(75) Inventors: **Scott Forstall**, Mountain View, CA (US); **Imran A. Chaudhri**, San Francisco, CA (US); **John O. Louch**, San Luis Obispo, CA (US); **Eric Steven Peyton**, Lisle, IL (US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 205 days.

(21) Appl. No.: **11/346,603**

(22) Filed: **Feb. 1, 2006**

(65) **Prior Publication Data**

US 2007/0101297 A1 May 3, 2007

Related U.S. Application Data

(60) Provisional application No. 60/737,942, filed on Nov. 18, 2005.

(51) **Int. Cl.**
G06F 3/048 (2006.01)

(52) **U.S. Cl.** **715/779**; 715/765; 715/778

(58) **Field of Classification Search** 715/779
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,752,893	A	6/1988	Guttag et al.	
5,168,441	A	12/1992	Ornaheim et al.	
5,289,574	A	2/1994	Sawyer	
5,297,250	A	3/1994	Leroy et al.	
5,351,995	A	10/1994	Booker	
5,357,603	A	10/1994	Parker	
5,379,057	A	1/1995	Clough et al.	
5,388,201	A	2/1995	Hourvitz et al.	
5,416,890	A	5/1995	Beretta	
5,481,665	A	1/1996	Okada et al.	
5,490,246	A	2/1996	Brotsky et al.	
5,522,022	A	5/1996	Rao et al.	
5,537,630	A	7/1996	Berry et al.	
5,564,002	A *	10/1996	Brown	715/778
5,564,022	A	10/1996	Debnath et al.	
5,588,098	A	12/1996	Chen et al.	
5,602,997	A	2/1997	Carpenter et al.	
5,638,501	A	6/1997	Gough et al.	
5,644,737	A	7/1997	Tuniman et al.	
5,644,739	A	7/1997	Moursund	
5,651,107	A	7/1997	Frank et al.	

(Continued)

FOREIGN PATENT DOCUMENTS

DE 102 42 378 3/2004

(Continued)

OTHER PUBLICATIONS

VMWare, "VMWare Workstation User's Manual," 2002, pp. 12-13.*

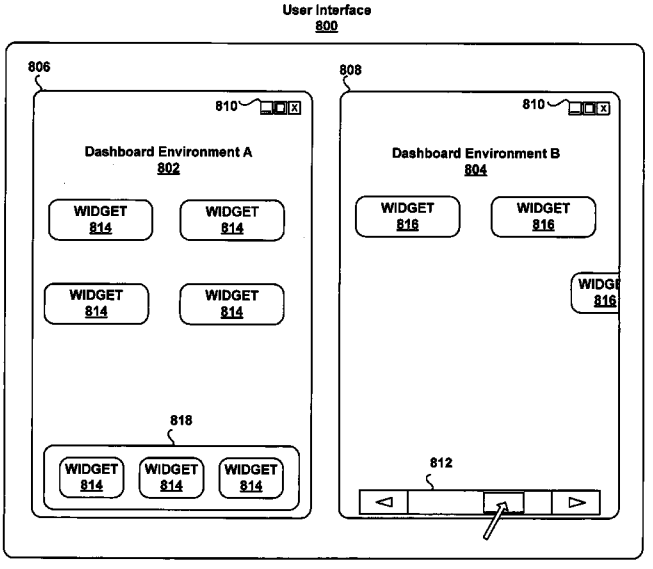
(Continued)

Primary Examiner — William L Bashore
Assistant Examiner — Daniel Um
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

Systems, methods, computer-readable mediums, user interfaces and other implementations are disclosed for organizing, managing and presenting widgets in display areas associated with multiple dashboard environments. In some implementations, a first display area associated with a first dashboard environment is configured for displaying at least one widget from a first set of widgets. A second display area associated with a second dashboard environment is configured for displaying at least one widget from a second set of widgets.

18 Claims, 24 Drawing Sheets



U.S. PATENT DOCUMENTS

5,657,049	A		8/1997	Ludolph et al.
5,659,693	A		8/1997	Hansen et al.
5,659,694	A		8/1997	Bibayan
5,666,416	A		9/1997	Micali
5,671,343	A		9/1997	Kondo et al.
5,675,362	A		10/1997	Clough et al.
5,689,664	A		11/1997	Narayanan et al.
5,708,764	A		1/1998	Borrel et al.
5,710,884	A		1/1998	Dedrick
5,721,848	A		2/1998	Joseph
5,727,135	A		3/1998	Webb et al.
5,731,819	A		3/1998	Gagne et al.
5,742,285	A		4/1998	Ueda
5,754,174	A		5/1998	Carpenter et al.
5,760,773	A		6/1998	Berman et al.
5,764,229	A		6/1998	Bennett
5,764,238	A		6/1998	Lum et al.
5,790,120	A		8/1998	Lozares et al.
5,793,376	A		8/1998	Tanaka et al.
5,796,402	A		8/1998	Ellison-Taylor
5,801,703	A		9/1998	Bowden et al.
5,809,230	A	*	9/1998	Pereira 726/35
5,835,692	A		11/1998	Cragun et al.
5,835,693	A		11/1998	Lynch et al.
5,838,316	A		11/1998	Arruza
5,870,734	A		2/1999	Kao
5,877,741	A		3/1999	Chee et al.
5,877,762	A		3/1999	Young et al.
5,878,219	A		3/1999	Vance et al.
5,883,639	A		3/1999	Walton et al.
5,900,876	A		5/1999	Yagita et al.
5,903,896	A		5/1999	Waldman et al.
5,917,436	A		6/1999	Endo et al.
5,920,659	A		7/1999	Iverson et al.
5,929,852	A		7/1999	Fisher et al.
5,933,148	A		8/1999	Oka et al.
5,949,409	A		9/1999	Tanaka et al.
5,963,191	A		10/1999	Jaaskelainen, Jr.
5,978,579	A		11/1999	Buxton et al.
5,999,948	A		12/1999	Nelson et al.
6,005,568	A		12/1999	Simonoff et al.
6,006,231	A		12/1999	Popa
6,011,562	A		1/2000	Gagne et al.
6,031,937	A		2/2000	Graffagnino
6,045,446	A		4/2000	Ohshima
6,061,695	A		5/2000	Slivka et al.
6,075,543	A		6/2000	Akeley
6,128,010	A		10/2000	Baxter et al.
6,133,915	A		10/2000	Arcuri et al.
6,144,381	A		11/2000	Lection et al.
6,154,601	A		11/2000	Yaegashi et al.
6,166,748	A		12/2000	Van Hook et al.
6,167,533	A		12/2000	Potterveld et al.
6,188,399	B1		2/2001	Voas et al.
6,191,797	B1		2/2001	Politis
6,195,664	B1		2/2001	Tolfa
6,211,890	B1		4/2001	Ohba
6,246,418	B1		6/2001	Oka
6,259,432	B1		7/2001	Yamada et al.
6,266,053	B1		7/2001	French et al.
6,266,430	B1		7/2001	Rhoads
6,272,484	B1		8/2001	Martin et al.
6,272,558	B1		8/2001	Hui et al.
6,275,831	B1		8/2001	Bodnar et al.
6,278,448	B1		8/2001	Brown et al.
6,278,450	B1		8/2001	Arcuri et al.
6,300,947	B1		10/2001	Kanevsky
6,304,684	B1		10/2001	Niczyporuk et al.
6,307,574	B1		10/2001	Ashe et al.
6,310,621	B1		10/2001	Gagne et al.
6,311,232	B1		10/2001	Cagle et al.
6,313,851	B1		11/2001	Matthews, III et al.
6,321,314	B1		11/2001	Van Dyke
6,333,753	B1		12/2001	Hinckley
6,344,855	B1		2/2002	Fisher et al.
6,353,437	B1		3/2002	Gagne
6,369,823	B2		4/2002	Ohba
6,369,830	B1		4/2002	Brunner et al.
6,396,520	B1		5/2002	Ording
6,401,104	B1		6/2002	LaRue et al.
6,411,301	B1		6/2002	Parikh et al.
6,412,021	B1		6/2002	Nguyen et al.
6,421,058	B2		7/2002	Parikh et al.
6,424,348	B2		7/2002	Parikh
6,434,744	B1		8/2002	Chamberlain et al.
6,452,600	B1		9/2002	Parikh et al.
6,456,290	B2		9/2002	Parikh et al.
6,457,034	B1		9/2002	Morein
6,466,218	B2		10/2002	Parikh et al.
6,466,237	B1		10/2002	Miyao et al.
6,469,714	B2		10/2002	Buxton et al.
6,483,524	B1		11/2002	Petchenkine et al.
6,484,261	B1		11/2002	Wiegel
6,487,560	B1		11/2002	LaRue et al.
6,489,963	B2		12/2002	Parikh et al.
6,512,522	B1		1/2003	Miller et al.
6,515,682	B1		2/2003	Washington et al.
6,525,736	B1		2/2003	Erikawa et al.
6,526,174	B1		2/2003	Graffagnino
6,535,892	B1		3/2003	LaRue et al.
6,536,041	B1		3/2003	Knudson et al.
6,542,160	B1		4/2003	Abgrall
6,542,166	B1		4/2003	Washington et al.
6,544,295	B1		4/2003	Bodnar
6,571,328	B2		5/2003	Liao et al.
6,573,896	B1		6/2003	Ribadeau et al.
6,577,317	B1		6/2003	Duluk, Jr. et al.
6,580,430	B1		6/2003	Hollis et al.
6,590,592	B1		7/2003	Nason et al.
6,609,977	B1		8/2003	Shimizu et al.
6,614,444	B1		9/2003	Duluk, Jr. et al.
6,618,048	B1		9/2003	Leather
6,636,214	B1		10/2003	Leather et al.
6,639,595	B1		10/2003	Drebin et al.
6,661,426	B1		12/2003	Jetha et al.
6,664,958	B1		12/2003	Leather et al.
6,664,962	B1		12/2003	Komsthoeft et al.
6,664,986	B1		12/2003	Kopelman et al.
6,674,438	B1		1/2004	Yamamoto et al.
6,697,074	B2		2/2004	Parikh et al.
6,707,462	B1		3/2004	Peercy et al.
6,714,201	B1		3/2004	Grinstein et al.
6,714,221	B1		3/2004	Christie et al.
6,715,053	B1		3/2004	Grigor
6,717,599	B1		4/2004	Olano
6,724,403	B1		4/2004	Santoro et al.
6,734,864	B2		5/2004	Abgrall
6,738,804	B1		5/2004	Lo
6,741,242	B1		5/2004	Itoh et al.
6,742,042	B1		5/2004	Holden et al.
6,757,698	B2		6/2004	McBride et al.
6,760,046	B2		7/2004	I'Anson et al.
6,765,592	B1		7/2004	Pletcher et al.
6,788,318	B2		9/2004	Chen
6,792,616	B1		9/2004	Jerding et al.
6,806,892	B1		10/2004	Plow et al.
6,882,979	B1		4/2005	Reay et al.
6,892,360	B1		5/2005	Pabla et al.
6,906,720	B2		6/2005	Emberling et al.
6,910,000	B1		6/2005	Yedidia et al.
6,911,984	B2		6/2005	Sabella et al.
6,918,091	B2		7/2005	Leavitt et al.
6,931,633	B1		8/2005	Vazquez et al.
6,944,829	B2		9/2005	Dando
6,993,721	B2		1/2006	Rosin et al.
7,007,242	B2		2/2006	Suomela et al.
7,016,011	B2		3/2006	De Haan
7,024,381	B1		4/2006	Hastings et al.
7,027,055	B2		4/2006	Anderson et al.
7,028,264	B2		4/2006	Santoro et al.
7,036,083	B1		4/2006	Zenith
7,050,955	B1		5/2006	Carmel et al.
7,076,730	B1		7/2006	Baker
7,085,994	B2		8/2006	Gvily
7,107,546	B2		9/2006	Coulthard
7,127,473	B2		10/2006	Agassi et al.
7,127,713	B2		10/2006	Davis et al.

7,146,563 B2 12/2006 Hesmer et al.
7,174,512 B2 2/2007 Martin et al.
7,185,290 B2 2/2007 Cadiz et al.
7,191,399 B2 3/2007 Ohtani et al.
7,222,155 B1 5/2007 Gebhardt et al.
7,242,406 B2 7/2007 Robotham et al.
7,249,327 B2 7/2007 Nelson et al.
7,260,380 B2 8/2007 Dietl et al.
7,269,792 B2 9/2007 Consolatti et al.
7,281,202 B2 10/2007 Croney et al.
7,293,034 B2 11/2007 Paya et al.
7,315,848 B2 1/2008 Pearse et al.
7,328,435 B2 2/2008 Trifon
7,503,010 B2 3/2009 Chaudhri et al.
7,530,026 B2 3/2009 Chaudhri et al.
7,546,543 B2 6/2009 Louch et al.
7,802,246 B1 9/2010 Kennedy et al.
2001/0030647 A1 10/2001 Sowizral et al.
2001/0035885 A1 11/2001 Iron et al.
2002/0013822 A1 1/2002 West
2002/0054148 A1 5/2002 Okada
2002/0059594 A1 5/2002 Rasmussen et al.
2002/0065946 A1 5/2002 Narayan
2002/0067418 A1 6/2002 I
2002/0078453 A1 6/2002 Kuo
2002/0085037 A1 7/2002 Leavitt et al.
2002/0089526 A1 7/2002 Buxton et al.
2002/0093516 A1 7/2002 Brunner et al.
2002/0099678 A1 7/2002 Albright et al.
2002/0105548 A1 8/2002 Hayton et al.
2002/0112180 A1 8/2002 Land et al.
2002/0114466 A1 8/2002 Tanaka et al.
2002/0118217 A1 8/2002 Fujiki
2002/0120673 A1 8/2002 Tolson et al.
2002/0123739 A1 9/2002 Haacke et al.
2002/0129092 A1 9/2002 Tolson et al.
2002/0133508 A1 9/2002 LaRue et al.
2002/0140740 A1 10/2002 Chen
2002/0158902 A1 10/2002 Hooker et al.
2002/0171682 A1 11/2002 Frank et al.
2002/0174003 A1 11/2002 Redmann et al.
2002/0174181 A1 11/2002 Wei
2002/0180798 A1 12/2002 Poor et al.
2002/0186257 A1 12/2002 Cadiz et al.
2002/0196268 A1 12/2002 Wolff et al.
2003/0008661 A1 1/2003 Joyce et al.
2003/0008711 A1 1/2003 Corbo
2003/0009267 A1 1/2003 Dunsky et al.
2003/0018971 A1 1/2003 McKenna, Jr.
2003/0020671 A1 1/2003 Santoro et al.
2003/0032409 A1 2/2003 Hutcheson et al.
2003/0046316 A1 3/2003 Gergic et al.
2003/0061482 A1 3/2003 Emmerichs
2003/0067489 A1 4/2003 Wong et al.
2003/0069904 A1 4/2003 Hsu et al.
2003/0076369 A1 4/2003 Resner et al.
2003/0080995 A1 5/2003 Tenenbaum et al.
2003/0097659 A1 5/2003 Goldman
2003/0101046 A1 5/2003 Krasnov
2003/0122787 A1 7/2003 Zimmerman et al.
2003/0123739 A1 7/2003 Graffagnino
2003/0146934 A1 8/2003 Bailey et al.
2003/0154239 A1 8/2003 Davis et al.
2003/0158975 A1 8/2003 Frank et al.
2003/0164862 A1 9/2003 Cadiz et al.
2003/0169306 A1 9/2003 Makipaa et al.
2003/0174136 A1 9/2003 Emberling et al.
2003/0174154 A1 9/2003 Yukie et al.
2003/0184552 A1 10/2003 Chadha
2003/0184584 A1 10/2003 Vachuska et al.
2003/0191799 A1 10/2003 Araujo et al.
2003/0206195 A1 11/2003 Matsa et al.
2003/0208685 A1 11/2003 Abdel-Rahman
2004/0003402 A1 1/2004 McKenna, Jr.
2004/0012626 A1 1/2004 Brookins
2004/0032409 A1 2/2004 Girard
2004/0036711 A1 2/2004 Anderson
2004/0039934 A1 2/2004 Land et al.
2004/0070629 A1 4/2004 Seifert
2004/0125128 A1 7/2004 Chang et al.
2004/0179019 A1 9/2004 Sabella et al.
2004/0183800 A1 9/2004 Peterson
2004/0194020 A1 9/2004 Beda et al.
2004/0205504 A1 10/2004 Phillips
2004/0212640 A1 10/2004 Mann et al.
2004/0215740 A1 10/2004 Frank et al.
2004/0223003 A1 11/2004 Heirich et al.
2004/0225955 A1 11/2004 Ly
2004/0230911 A1 11/2004 Bent et al.
2004/0237082 A1 11/2004 Alcazar et al.
2004/0255253 A1 12/2004 Marcjan
2004/0261012 A1 12/2004 Balsiger
2004/0261037 A1 12/2004 Ording et al.
2004/0261038 A1 12/2004 Ording et al.
2005/0010419 A1 1/2005 Pourhamid
2005/0010634 A1 1/2005 Henderson et al.
2005/0021935 A1 1/2005 Schillings et al.
2005/0022139 A1 1/2005 Gettman et al.
2005/0039144 A1 2/2005 Wada et al.
2005/0057497 A1 3/2005 Kawahara
2005/0060655 A1 3/2005 Gray et al.
2005/0060661 A1 3/2005 Kawahara et al.
2005/0088447 A1 4/2005 Hanggie et al.
2005/0088452 A1 4/2005 Hanggie et al.
2005/0091571 A1 4/2005 Leichtling
2005/0091690 A1 4/2005 Delpuch et al.
2005/0114021 A1 5/2005 Krull et al.
2005/0144563 A1 6/2005 Hough et al.
2005/0144595 A1 6/2005 McLean
2005/0149458 A1 7/2005 Eglen et al.
2005/0160368 A1 7/2005 Liu et al.
2005/0168471 A1 8/2005 Paquette
2005/0168476 A1 8/2005 Levene et al.
2005/0172239 A1 8/2005 Liu et al.
2005/0183026 A1 8/2005 Amano et al.
2005/0193368 A1 9/2005 Becker et al.
2005/0198584 A1 9/2005 Matthews et al.
2005/0215310 A1 9/2005 Boyd et al.
2005/0221808 A1 10/2005 Karlsson et al.
2005/0240857 A1 10/2005 Benedict et al.
2005/0243373 A1 11/2005 Silverbrook et al.
2005/0256940 A1 11/2005 Henderson et al.
2005/0278651 A1 12/2005 Coe et al.
2005/0282612 A1 12/2005 Matthews
2005/0283734 A1 12/2005 Santoro et al.
2006/0001652 A1 1/2006 Chiu et al.
2006/0004913 A1 1/2006 Chong
2006/0005207 A1 1/2006 Louch et al.
2006/0010394 A1 1/2006 Chaudhri et al.
2006/0015818 A1 1/2006 Chaudhri et al.
2006/0015846 A1 1/2006 Fraleigh et al.
2006/0031264 A1 2/2006 Bosworth et al.
2006/0036703 A1 2/2006 Fulmer et al.
2006/0036941 A1 2/2006 Neil
2006/0036969 A1 2/2006 Guido et al.
2006/0053384 A1 3/2006 La Fetra et al.
2006/0075033 A1 4/2006 Bienstock et al.
2006/0075106 A1 4/2006 Hochmuth et al.
2006/0075141 A1 4/2006 Boxenhorn
2006/0089840 A1 4/2006 May
2006/0095331 A1 5/2006 O'Malley et al.
2006/0107231 A1 5/2006 Matthews et al.
2006/0112123 A1 5/2006 Clark et al.
2006/0123356 A1 6/2006 Sobeski et al.
2006/0123359 A1 6/2006 Schatzberger et al.
2006/0136843 A1 6/2006 Shafron
2006/0150118 A1 7/2006 Chaudhri et al.
2006/0156248 A1 7/2006 Chaudhri et al.
2006/0168536 A1 7/2006 Portmann
2006/0197752 A1 9/2006 Hurst et al.
2006/0206835 A1 9/2006 Chaudhri et al.
2006/0218499 A1 9/2006 Matthew et al.
2006/0230059 A1 10/2006 Etgen et al.
2006/0236257 A1 10/2006 Othmer et al.
2006/0253794 A1 11/2006 Wilson
2006/0271637 A1 11/2006 McKeon et al.
2006/0274086 A1 12/2006 Forstall et al.
2006/0277469 A1 12/2006 Chaudhri et al.

2006/0277481	A1	12/2006	Forstall et al.
2007/0011026	A1	1/2007	Higgins et al.
2007/0038934	A1	2/2007	Fellman
2007/0044029	A1	2/2007	Fisher et al.
2007/0044039	A1	2/2007	Amadio et al.
2007/0061724	A1	3/2007	Slothouber et al.
2007/0074126	A1	3/2007	Fisher et al.
2007/0101146	A1	5/2007	Louch et al.
2007/0101279	A1	5/2007	Chaudhri et al.
2007/0101288	A1	5/2007	Forstall et al.
2007/0101291	A1	5/2007	Forstall
2007/0101433	A1	5/2007	Louch et al.
2007/0118813	A1	5/2007	Forstall et al.
2007/0130541	A1	6/2007	Louch et al.
2007/0162850	A1	7/2007	Adler et al.
2007/0203984	A2	8/2007	AlHusseini et al.
2007/0209013	A1	9/2007	Ramsey et al.
2007/0266093	A1	11/2007	Forstall et al.
2008/0016468	A1	1/2008	Chambers et al.
2008/0034309	A1	2/2008	Louch et al.
2008/0034314	A1	2/2008	Louch et al.
2008/0155453	A1	6/2008	Othmer
2008/0168367	A1	7/2008	Chaudhri et al.
2008/0168368	A1	7/2008	Louch et al.
2008/0168382	A1	7/2008	Louch et al.
2009/0005071	A1	1/2009	Forstall et al.
2009/0021486	A1	1/2009	Chaudhri et al.
2009/0024944	A1	1/2009	Louch et al.
2009/0044138	A1	2/2009	Rudolph et al.
2009/0125815	A1	5/2009	Chaudhri et al.
2009/0144644	A1	6/2009	Chaudhri et al.
2009/0158193	A1	6/2009	Chaudhri et al.
2009/0187841	A1	7/2009	Chaudhri et al.
2009/0260022	A1	10/2009	Louch et al.
2009/0271724	A1	10/2009	Chaudhri et al.

FOREIGN PATENT DOCUMENTS

EP	548586	6/1993
EP	0694879	1/1996
EP	0 908 835	4/1999
EP	1 237 076	9/2002
EP	1383080	1/2004
EP	0972273	3/2004
EP	1 724 996	11/2006
WO	WO 96/06401	2/1996
WO	WO 97/07467	2/1997
WO	WO 98/07112	2/1998
WO	WO 98/45815	10/1998
WO	WO 02/09039	1/2002
WO	WO 03/023593	3/2003
WO	WO 2004/027707	4/2004
WO	WO 2004/076977	9/2004
WO	WO 2006/012343	2/2006
WO	WO 2006/020304	2/2006
WO	WO 2006/119269	11/2006
WO	WO 2009/012319	12/2009
WO	WO 2009/012330	12/2009

OTHER PUBLICATIONS

Steven Warren, "The VMware Workstation 5 Handbook," Jun. 2005, Course Technology PTR.*

"Writing a Desk Accessory," Developer Connection, Apple Computer, Inc. Jul. 3, 1996, [online] [Retrieved on Jan. 3, 2006] Retrieved from the Internet URL: http://developer.apple.com/documentation/mac/devices/devices-16.html>, 3 pages.

Akeley, Kurt, and Hanrahan, Pat, "Real-Time Graphics Architecture," http://www.grahics.stanford.edu/courses/cs448a-01-fall, the OpenGL Graphics System, CS448 Lecture 15, Fall, 2001, pp. 1-20.

Altman, R.B., "Visual Quickstart Guide Power Point 2000/98, Applying Preset Animations," ProQuest Safari Books, Peachpit Press, May 7, 1999, 7 pages [online] Retrieved from the Internet: <URL:http://proquest.safaribooksonline.com/0201354411>.

Archive of "Objects, Images and Applets," W3C Recommendation, Feb. 10, 2003, [online] [Archived by http://archivve.org; Retrieved on Apr. 13, 2006] Retrieved from the Internet URL:http://web.archivve.org/web/20030210154019/http://www.w3.org/TR/REC-html40/struct/objects.html, 21 pages.

Cadiz, JJ et al., "Slideshow: Providing Peripheral Awareness of Important Information," Technical Report MSR-TR-2001-83, (Sep. 14, 2001), 9 pages. Microsoft Corporation, Redmond, WA.

Conner Borookshire D. et al. "Three-Dimensional Widgets" ACM 1992, 8 pages.

Elliott, Conal, "Programming Graphics Processors Functionally," Proceedings of the 2004 Haskell Workshop, Sep. 22, 2004. 11 pages.

Fried, Ina, "Developer Calls Apple's Tiger a Copycat," CNET News.com, Jun. 28, 2004 [online] Retrieved on Jul. 1, 2004] Retrieved from the Internet URL:http://zdnet.com.com/2102-1104_2-250692.html?tag=printthis, 2 pages.

Fried, Ina, "For Apple's Tiger, the Keyword is Search", CNET News.com, Jun. 28, 2004 [online] Retrieved on Jul. 1, 2004] Retrieved from the Internet URL:http://zdnet.com.com/2102-1103_2-5250346.html?tag=printthis, 2 pages.

Guber, John et al., "Dashboard vs. Konfabulator", Jun. 2004, 9 pages.

Haeberli, P. et al., "The Accumulation Buffer: Hardware Support for High-Quality Rendering," Computer Graphics, Aug. 1990, pp. 309-318, vol. 24, No. 4.

Http://en.wikipedia.org/wiki/Comparison_of widget_engines, 2007, 6 pages.

http://en.wikipedia.org/wiki/Windows-Sidebar, 2007, 7 pages.

http://www.nat.org/dashboard/blog.php3 Dec. 2003, 31 pages.

International Search Report , PCT/US2005/008804, Jul. 27, 2005, 3 pages.

International Search Report and Writen Opinion, PCT/US2005/022152, Jul. 10, 2006, 8 pages.

Konfabulator, "Cupertino, Start your Photocopiers!," [online] [Retrieved on Jul. 1, 2004] Retrieved from the Internet <URL: http://www.konfabulator.com>, 1 page.

Konfabulator, "Konfabulator & Widget Basics," [online] [Retrieved on Jul. 1, 2004] Retrieved from the Internet <URL: http://www.konfabulator.com/info/basics.html>, 3 pages.

Konfabulator, "Screenshots," [online] [Retrieved from the Internet <URL: http://www.konfabulator.com/info/screenshots.html>, 2 pages.

Konfabulator, "What is Konfabulator?," [online] [Retrieved on Jul. 1, 2004] Retrieved from the Internet <URL: http://www.konfabulator.com/info/, 3 pages.

Lammers, J.., et al., "Maya 4.5 Fundamentals: Particles," New Riders Publishing, Jan. 14, 2003, 12 pages, [online] [retrieved on Feb. 17, 2007] Retrieved from ProQuest Safari Books Online on the Internet: <URL: http://proquest.safaribooksonline.com/0735713278>, 12 pages.

Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority, PCT/US2005/022579, 15 pages.

Nvidia, "CG—Teaching Cg," Power Point Presentation, Author and date unknown, pp. 1-16.

Puder, A., "Extending Desktop Applications to the Web," ACM International Conference Proceedings Series, Proceedings of the Jun. 2004 International Symposium on Information and Communication Technologies, 2004, vol. 90, 6 pages.

Rochkind, M. et al., "Common Elements in Today's Graphical User Interfaces: The Good, the Bad, and the Ugly," Interchi '93, AMC, Apr. 24-29, 1993, pp. 470-473.

Segal, Mark and Akeley, Kurt, "The OpenGL Graphics System: A Specification (Version 1.5)," Copyright 1992-2003 Silicon Graphics, Inc., Oct. 30, 2003, 334 pages.

Shantzis, Michael A., "A Model for Efficient and Flexible Image Computing," Computer Graphics Proceedings, Annual Conference Series, Orlando, Florida, Jul. 24-29, 1994, pp. 147-154.

Snippet Software Inc. et al. "Corporate Portal Newsletter" Oct. 2000, 3 pages.

Snippet Software Inc. et al. "Snippets Software" Jun. 2001, 16 pages.

Staples, Loretta, "Representation in Virtual Space: Visual Convention in the Graphical User Interface," Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Apr. 1993.

http://www.nat.org/dashboard/blog.php3__Dec. 2003, 8 pages.

Stardock.com et al. "DesktopX Whitepaper and users Guide" 1999, 72 pages.

Tang, J.C. et al., "ConNexus to Awarenex: Extending Awareness to Mobile Users," SIGCHI '01, AMC, Mar. 31-Apr. 4, 2001, 8 pages.

Ullenboom, C., "Java is auch eine Insel," 2003, [online] [Retrieved on Apr. 13, 2006] Retrieved from the Internet URL: http://www.galileocomputing.de/openbook/javainsel2//java_140000.htm#Xxx998138, 3 pages.

Van Gelder, Allen, and Kwansik, Kim, "Direct Volume Rendering with Shading via Three-Dimensional Textures," Computer Science Dept., Univ. of California, Santa Cruz, CA 95064, 9 pages.

Wardell, Brad, Konfabulator for Windows, Jan. 10, 2004; [online] Retrieved from the Internet Mar. 6, 2006] Retrieved from the Internet: URL:http://www.xpthemes.com/forums.asp?MID=19&CMID=19&AID=4472, 6 pages.

International Search Report and Written Opinion, PCT/US06/44634, Jul. 2, 2008, 13 pages.

Louch et al., "Multidimensional Widgets", U.S. Appl. No. 12/612,301, filed Nov. 4, 2009.

"About Merkitys"; [online] [Retrieved on Feb. 4, 2008]; Retrieved from the Internet, URL: http://meaning.3xi.org/; 3 pages.

"Advanced Digital Photo Solutions"; GeoSpatial Experts; [online] [Retrieved on Feb. 4, 2008]; Retrieved from the Internet, URL: http://www.geospatialexperts.com/productadv.html; 4 pages.

"Comarison of widget engines", http://en.wikipedia.org/wiki/Comparison_of_widget_engines, 2007, 6 pages.

"Coolsmartphone"; [online] [Retrieved on Apr. 13, 2006]; Retrieved from the Internet, URL: http://www.coolsmartphone.com/article569.html; 57 pages.

"Dashboard Blog", Dec. 2003, Retrieved from the Internet on May 11, 2007 <URL:http://www.nat.org/dashboard/blog.php3> 31 pages.

"Garmin hits iphone directly with nuvifone"; [online] [Retrieved on Mar. 17, 2008]; Retrieved from the Internet, URL: http://www.electronista.com/print/50764; 3 pages.

"Garmin® nüvifone™ Takes Personal Navigation and Communication to the Next Level"; Garmin International; [online] [Retrieved on Mar. 17, 2008]; Retrieved from the Internet, URL: http://www8.garmin.com/pressroom/mobile/013008.html; 3 pages.

"Go View Map Save to Favorites Cancel"; [online] [Retrieved on Feb. 4, 2008]; Retrieved from the Internet, URL: http://www8.garmin.com/buzz/nuvifone/m/g/sc-geotag-lg.jpg; 1 page.

"GPS Blogging Phones"; [online] [Retrieved on Apr. 5, 2006] Retrieve from the Internet, URL: http://www.dailywireless.org/modules.php?name=News&file=article&sid=4613; 3 pages.

"International Roaming Guide—Personal Experience(s) from Customer and Community Member"; [online] [Retrieved Jun. 26, 2006] Retrieved from the Internet <URL: http://forums.cingular.com/cng/board/message?board.id=1185; 6 pages.

"MOREnet Dialing Plan: PSTN and IP Network Integration for H.323, H320 VoIP and Public Voice Networks", [online] [Retrieved on Jan. 11, 2008] Retrieved from the Interent <URL: http://www.more.net/technical/research/dialplan/index.html, 12 pages.

"New Improved Panoramio—Geo Photo Sharing"; Google Earth Blog; [online] [Retrieved on Feb. 5, 2008]; Retrieved from the Internet, URL: http://www.gearthblog.com/blog/archives/2006/06/new_improved_pa.html, 1 page.

"Snap, Map and Share Your World"; IsWhere by Red Hen Systems; [online] [Retrieved on Jun. 3, 2008]; Retrieved from the Internet, URL: http://www.redhensystems.com/products/multimedia_mapping_software/iswhere/default.asp?sm=2; 1 page.

"Windows Sidebar", Wikipedia, Retrieved from the Internet, <URL:http://en.wikipedia.org/wiki/Windows-Sidebar>, 2007, 7 pages.

"Convert just about Anything to Anything else", OnlineConversion.com, Aug. 2000, [online] [Retrieved on Jun. 22, 2008] Retrieved from the Internet, URL:http://web.archive.org/web/200000815055422/http://www.onlineconversion.com/>.

Beier et al., "The bull's-eye: a framework for web application user interface design guidelines", Proceedings of the Sigchi Conference on Human Factors in Computing Systems, Apr. 2003, pp. 489-496.

Carey et al., "Integrating Widget Design Knowledge with User Interface Toolkits", Proceedings of the Fifth International Workshop on Computer-Aided Software Engineering, Jul. 1992, pp. 204-212.

Chen et al., "The Model of Optimum Route Selection in Vehicle Automatic Navigation System Based on Unblocked Reliability Analyses", Intelligent Transportation Systems, 2003, Proceedings, IEEE (2003), vol. 2, 12-15, Oct. 2003, pp. 975-978.

Chinese Notification of First Office Action, Chinese Patent Application No. 200580016349.3, Jul. 25, 2008, 21 pages.

Han; "Bi-manual, multi-point, and multi-user interactions on a graphical interaction surface"; Mutli-Touch Interaction Research; [online] [Retrieved on Apr. 13, 2006]; Retrieved from the Internet, URL: http://mrl.nyu.edu/~jhan/ftirtouch/; 4 pages.

Helal et al., "Drishti: An Integrated Navigation System for Visually Impaired and Disabled", Fifth International Symposium on Wearable Computers (ISWC'01), IEEE, 2001, pp. 149-156.

Invitation to Pay Additional Fees(Form PCT/ISA/206) and Communication Relating to the Results of the Partial Intrenational Search (PCT/ISA/206 (Annex)) for PCT/US2007/077441; dated Jan. 28, 2008, 8 pages.

Invitation to Pay Additional Fees(Form PCT/ISA/206) and Communication Relating to the Results of the Partial Intrenational Search (PCT/ISA/206 (Annex)) for PCT/US2008/050295; dated Jul. 29, 2008.

Microsoft Corporation, "Microsoft® Windows™ Graphical Environment User's Guide", Version 3.0 for MS-DOS® or PC-DOS Operating System, 1990, Document No. SY06851-0290, pp. Cover-vii, 15-75, 315-353.

Microsoft Corporation, "User's Guide Microsoft® Windows™ and MS-DOS® 6", 1993, pp. Cover-xvi, 112-121.

Rist et al., "Customizing Graphics for Tiny Displays of Mobile Devices", Personal and Ubiquitous Computing, 2002, pp. 260-268, vol. 6.

Shiozawa, Hidekazu et al., "Perspective Layered Visualization of Collaborative Workspaces," Proceedings of the International ACM SIGGROUP conference on Supporting Group Work Publisher, Nov. 1999, 5 pages.

Stardock et al., "DesktopX General Guide," Aug. 2000, [online] [Retrieved on Jan. 31, 2008] Retrieved from the Internet URL:http://www.stardock.com/products/desktopx/docs/.

Stardock et al., "DesktopX Tutorial", Aug. 2000, [online] [Retrieved on Jan. 31, 2008] Retrieved from the Internet URL:http://www.stardock.com/products/desktopx/tutorial.html.

Stardock et al., "DesktopX WhitePaper", Aug. 2000, [online] [Retrieved on Jan. 31, 2008] Retrieved from the Internet <URL:http://www.stardock.net/media/whitepaper_desktopx.html.

Stardock et al., "The User Guide—Version 2", DesktopX 2000.

Stardock et al., "What Can It Do? Making Objects", DesktopX Tutorial, 2001, [online] [Retrieved on Apr. 11, 2008] Retrieved from the Internet URL:http://web.archive.org/web/2001101922285/http://www.stardock.com/products/desktopx/....

Stardock News, DesktopX User Manual On-line:, 1999, 2003 [online] [Retrieved from the Internet on May 11, 2007] <URL:http://www.stardock.comnewsitem.asp?id=538>.

Partial Interntional Search Rpeort, dated May 15, 2009, issued in Interntional Application No. PCT/US2008/050047.

Invitation to Pay fees and Partial International Search Report, dated May 8, 2009, issued in PCT/US2008/050038.

Archive of BabelFish.com Inc., Oct. 2003, [online] [Archived by http://archive.org on Oct. 2, 2003; retrieved on Dec. 8, 2008] Retrieved from the Internet URL: <http://web.archive.org/web/20031002115902/www.babelfish.com/en/index.html>.

Starfish Software Introduces Starfish Internet Sidekick; Starfish Internet Sidekick is the best way for Internet users to manage their calendar, contacts and communications, Busienss Wire, Sep. 23, 1996, [online] [Retrieved on Dec. 8, 2008] Retrieved from the Internet URL: <http://findarticles.com/articles/mi_mOEIN/is_1996_Sept_23/ai_18704672?tag=rel.resl>.

Archive of www.gigaplex.com, Lazar Productions, Nov. 1996, [online] [Archieved by http://archive.org on Nov. 5, 1996; retrieved on Dec. 8, 2008] Retrieved from the Internet URL: <http://web.archive.org/web/19961105081827/www.gigaplex.com/>.

Archive of movies.com, Jan. 2002, [online] [Archived by http://archive.org on Jan. 18, 2002; Retrieved on Dec. 8, 2008] Retrieved from the Internet URL: <http://www.archive.org/web/20020118102516/movies.go.com>.

Baratz et al., "DesktopX 3/1", Ars Technica, Nov. 17, 2005, [online] [Retrieved on Aug. 1, 2008] Retrieved from the Internet URL: <http://arstechnica.com/reviews/apps/desktopx/ars.>.
Siracusa et al., "Mac OA 10.4 Tiger: Dashboard", Apr. 28, 2005, [online] [Retrieved on Aug. 1, 2008] Retrieved from the Internet URL: <http://arstechnica.com/reviews/os/macosz-10-4.ars/17>.
Wardell et al. "Apple's Dashboard vs. Konfabulator vs. DesktopX", Skinning the frog, Jul. 1, 2004, [online] [Retrieved on Aug. 1, 2008] Retrieved from the Internet URL: <http://frogboy.joeuser.com/article/19800>.
Thomas et al., "Animating Widgets in the InterViews Toolkit", Lecture Notes in Computer Science, pp. 26-44, 1995.
VMWare, "VMWare Workstation User's Manual", 2002, pp. 12-13.
JavaBoutique, Oct. 1, 2002. Available at: <http://javaboutique.internet.com/utilities/counter.html>.
Forstall, et al., U.S. Appl. No. 12/469,555, filed May 20, 2009.
"Portlet Communication: What is application scope, anyway?", Sep. 18, 2002, [online]; Retrieved from the Internet at URL: http://www.coderanch.com/t/203244/Portals-Portlets/java/Portlet-Communication-What-application-scope; 3 pages.
Akeley, "Cg—Teaching Cg," Power Point Presentation, NVIDIA Corporation, 2002; 1 page.
International Search Report and Written Opinion, dated Sep. 3, 2009, issued in International Application No. PCT/US2008/050047; 17 pages.
Konfabulator, "Konfabulator & Widget Basics—A Refresher Course in Widgetology", [online] [Retrieved on Jun. 5, 2009], Retrieved from the Internet URL: http://web.archive.org/web/20050811020610/http://konfabulator.com/basics; 16 pages.
Snippet Software, "Product Spotlight Non-browser based portal solution from Snippets Software", Corporate Portal Newsletter, Oct. 2000, vol. 1, No. 10, 3 pages.
Van Gelder et al., "Direct Volume Rendering with Shading via Three-Dimensional Textures,". Computer Science Dept., Univ. of California, Santa Cruz, CA 95064, Jul. 19, 1996; 17 pages.
"Sidekick", [Online] [Retrieved on October 12, 2009] Retrieved from the Internet at URL: http://en.widipedia.org/wiki/Sidekick; 5 pages.
International Search Report and Written Opinion, dated Oct. 16, 2009, issued in International Application No. PCT/US2008/070217.
Caceres et al., "Widget 1.0 Requirements", [Online] [Downloaded on Sep. 10, 2009]; Retrieved from the Internet at URL: http://www.w3.org/TR/2007/WD-widgets-reqs-20070705; 30 pages.
Warren, "The VMware Workstation 5 Handbook," Jun. 2005, *Course Technology PTR*, 50 pages.
Bauer, "Transparent User Modeling for a Mobile Personal Assistant," LWA 2004: Lernen-Wissensentdecking-Adaptivitat, [Online] Oct. 6, 2004, pp. 3-8, Berlin Retrieved from the Internet: URL:http://www.dfki.de/specter/Docs/Bauer04.pdf> [retrieved on Sep. 15, 2009].
TellWidget, Sep. 5, 2005, 3 pages.
Widget Creation Tutorial, Oct. 30, 2005, 25 pages.
Lieberman and Selker, "Agents for the User Interface," Handbook of Agent Technology, 2003, pp. 1-21, Retrieved from the Internet, URL: http://web.media.mit.edu/{lieber/Publications/Agents_for_UI.pdf> [retrieved on Sep. 15, 2009].
Bauer and Deru, "Motion-Based Adaptation of Information Services for Mobile Users," Lecture Notes in Computer Science, Aug. 19, 2005, Retrieved from the Internet, URL: http://www.springerlink.com/content/lwdvxw9ervxa44f9/fulltext.pdf>, [retrieved on Sep. 15, 2009], 6 pages.
"Desktop Sidebar", [online] [Retrieved on May 11, 2007] Retrieved from the Internet URL: http://web.archive.org/web/20040101160831/http://www.desktopsidebar.com/; 5 pages.
Javaboutique. Oct. 8, 2008. Available at: http://web.archive.org/web/20021208051951/http://javaboutique.internet.com/utilities/counter.html.

* cited by examiner

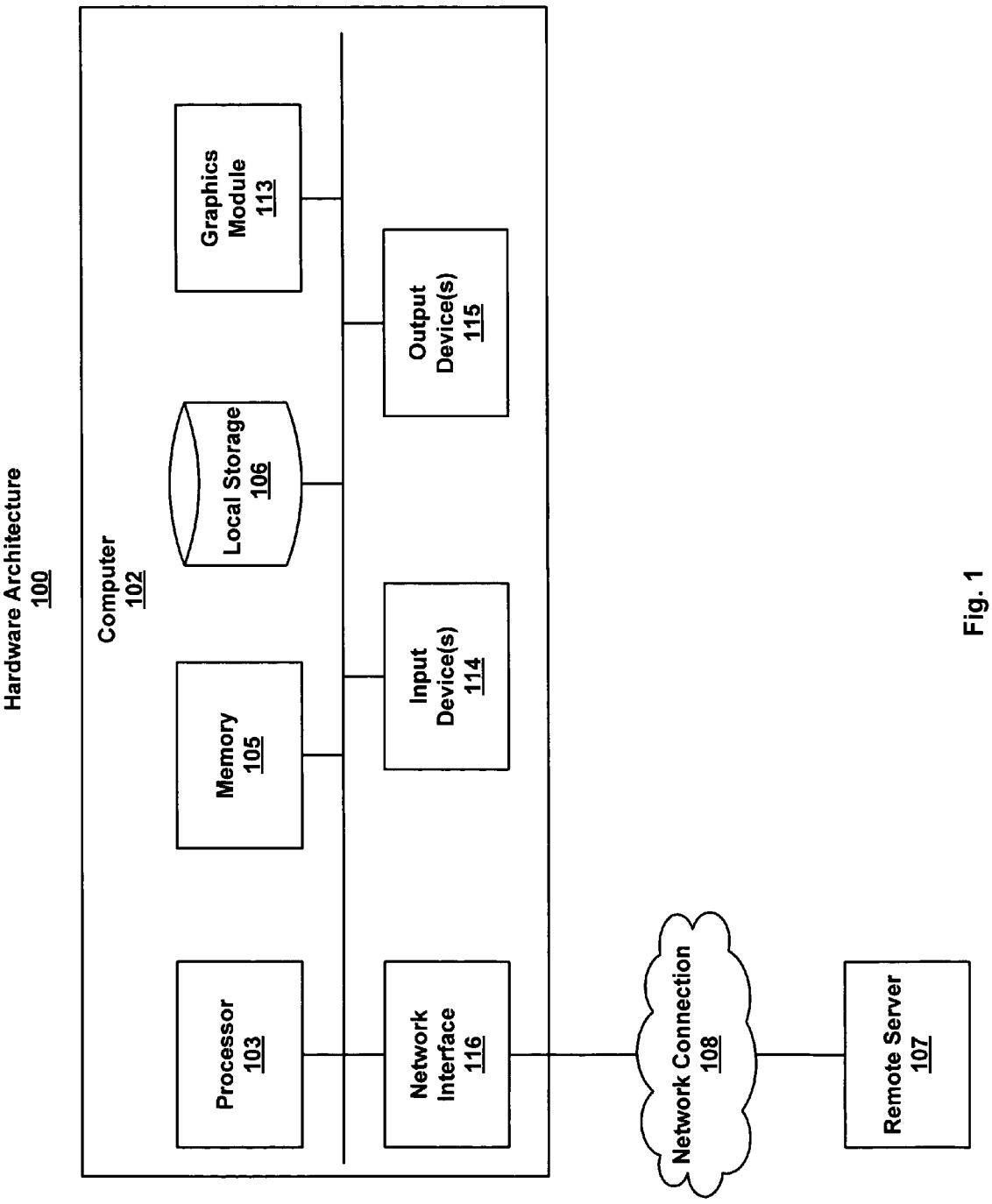

Hardware Architecture
100
Computer
102
Graphics Module
113
Output Device(s)
115
Local Storage
106
Memory
105
Input Device(s)
114
Processor
103
Network Interface
116
Network Connection
108
Remote Server
107

Fig. 1

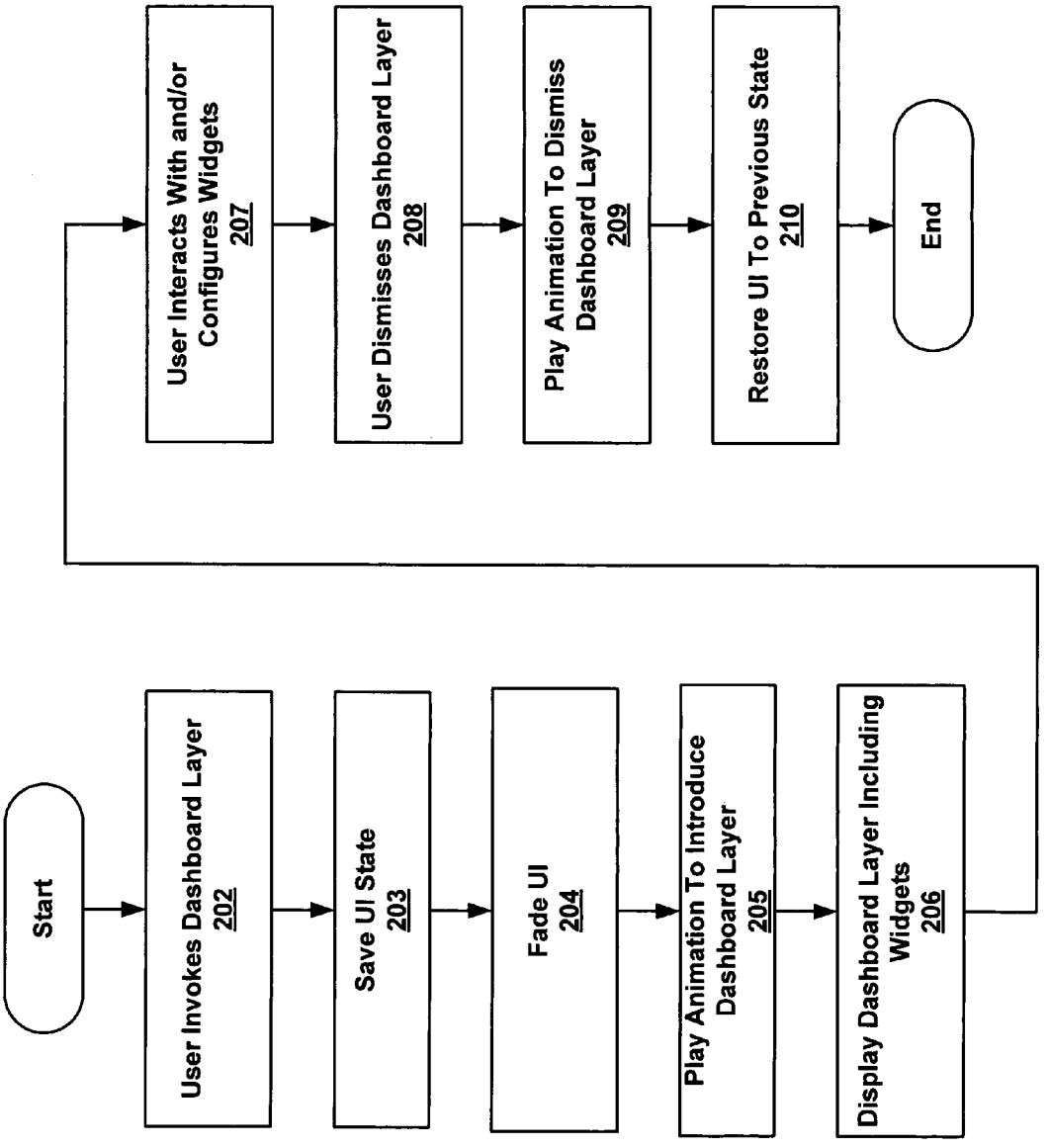

Start
User Invokes Dashboard Layer 202
Save UI State 203
Fade UI 204
Play Animation To Introduce Dashboard Layer 205
Display Dashboard Layer Including Widgets 206
User Interacts With and/or Configures Widgets 207
User Dismisses Dashboard Layer 208
Play Animation To Dismiss Dashboard Layer 209
Restore UI To Previous State 210
End

Fig. 2

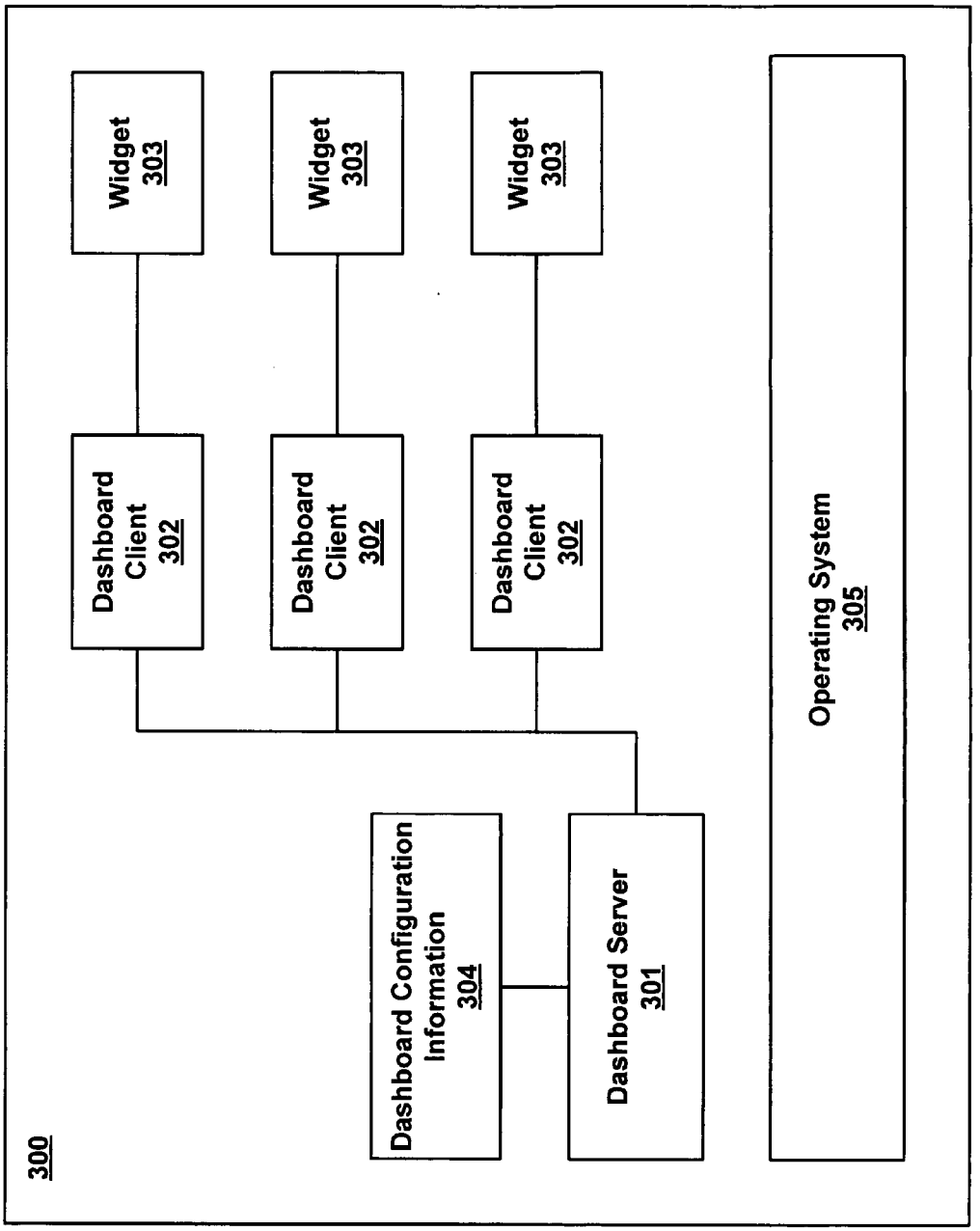

300
Widget 303
Widget 303
Widget 303
Dashboard Client 302
Dashboard Client 302
Dashboard Client 302
Dashboard Configuration Information 304
Dashboard Server 301
Operating System 305

Fig. 3

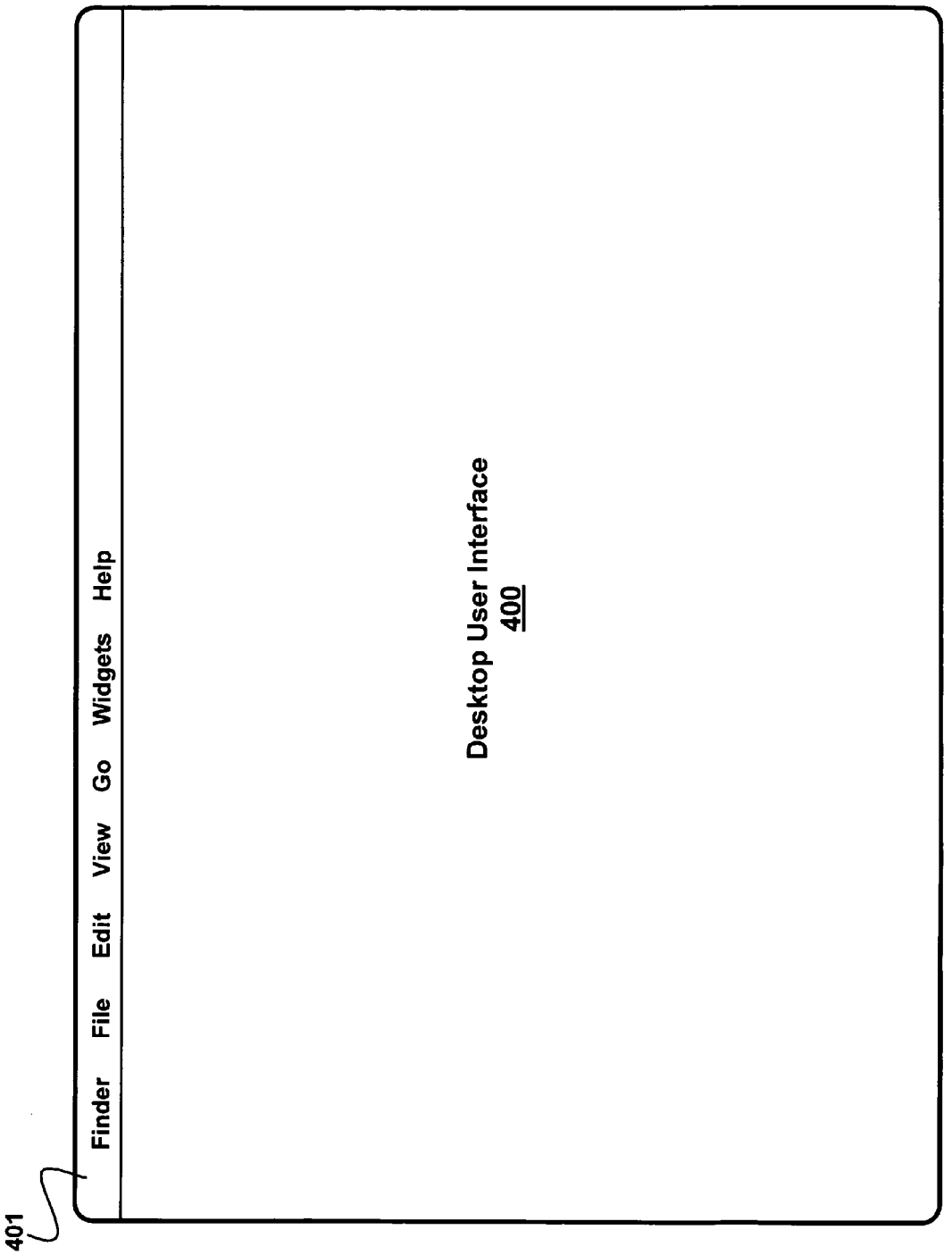

Finder File Edit View Go Widgets Help
Desktop User Interface
400
401

Fig. 4a

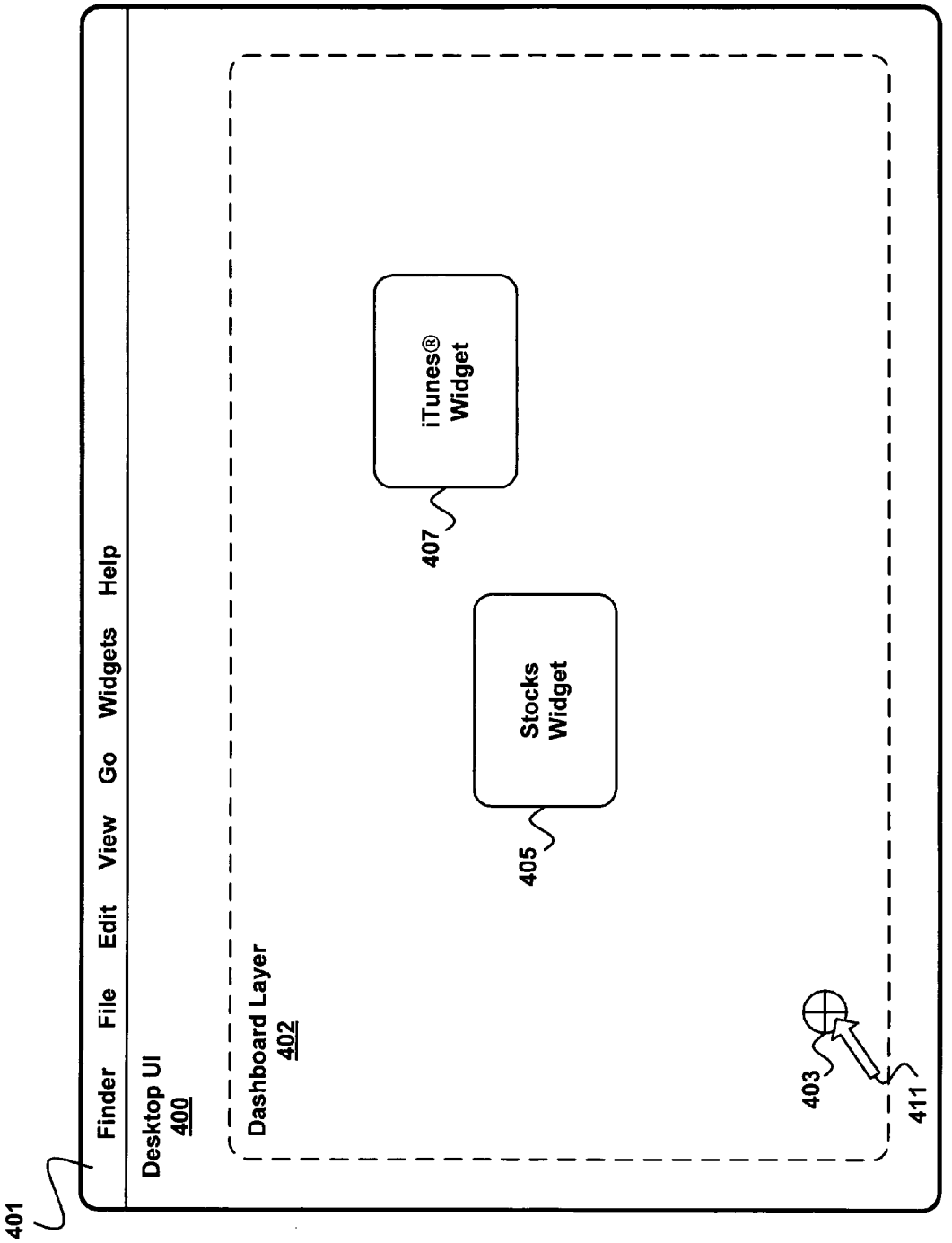

401
Finder File Edit View Go Widgets Help
Desktop UI
400
Dashboard Layer
402
iTunes® Widget
407
Stocks Widget
405
403
411

Fig. 4b

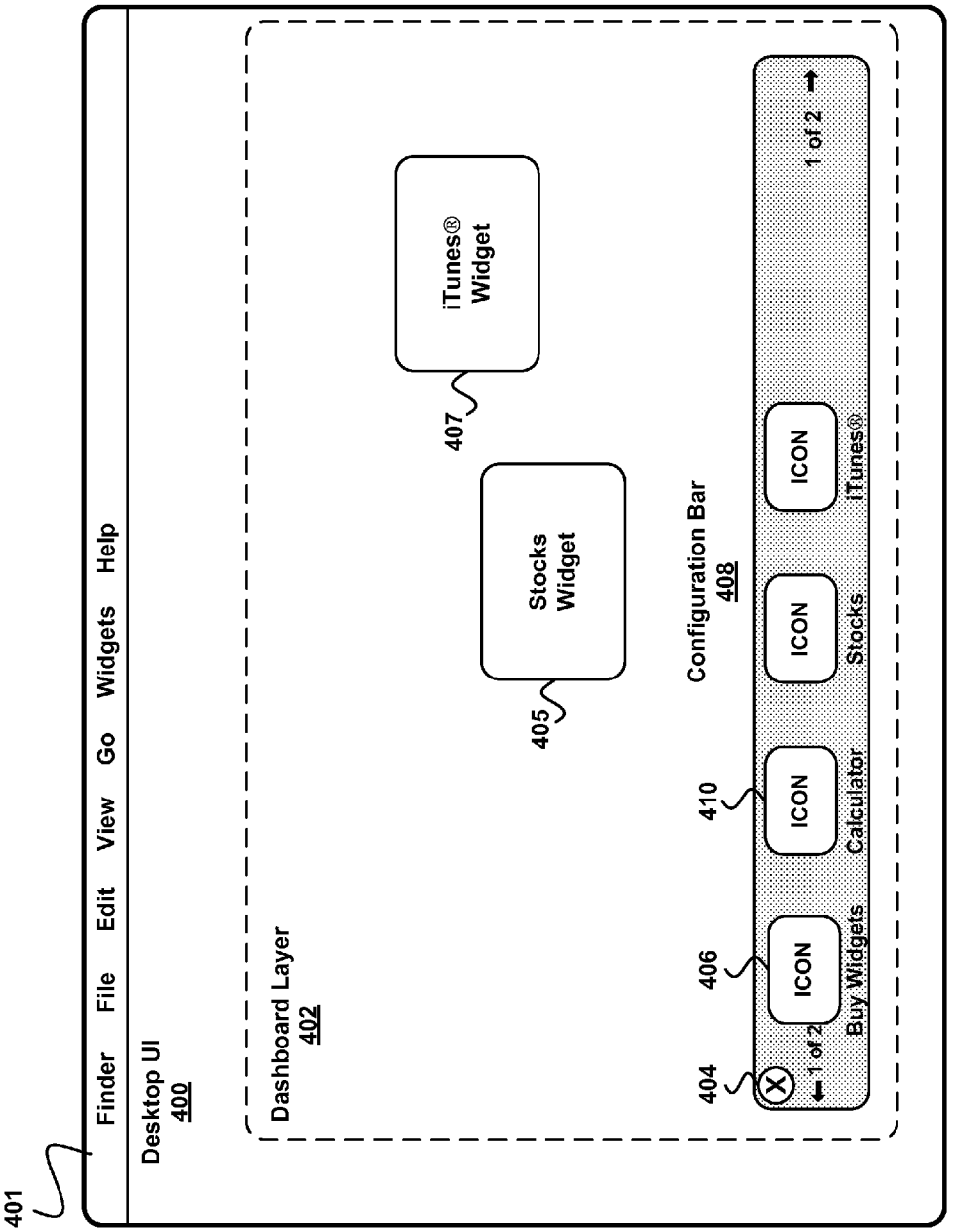

401
Finder File Edit View Go Widgets Help
Desktop UI
400
Dashboard Layer
402
iTunes® Widget
407
Stocks Widget
405
Configuration Bar
408
404
406
410
1 of 2
ICON
ICON
ICON
ICON
1 of 2
Buy Widgets
Calculator
Stocks
iTunes®

Fig. 4c

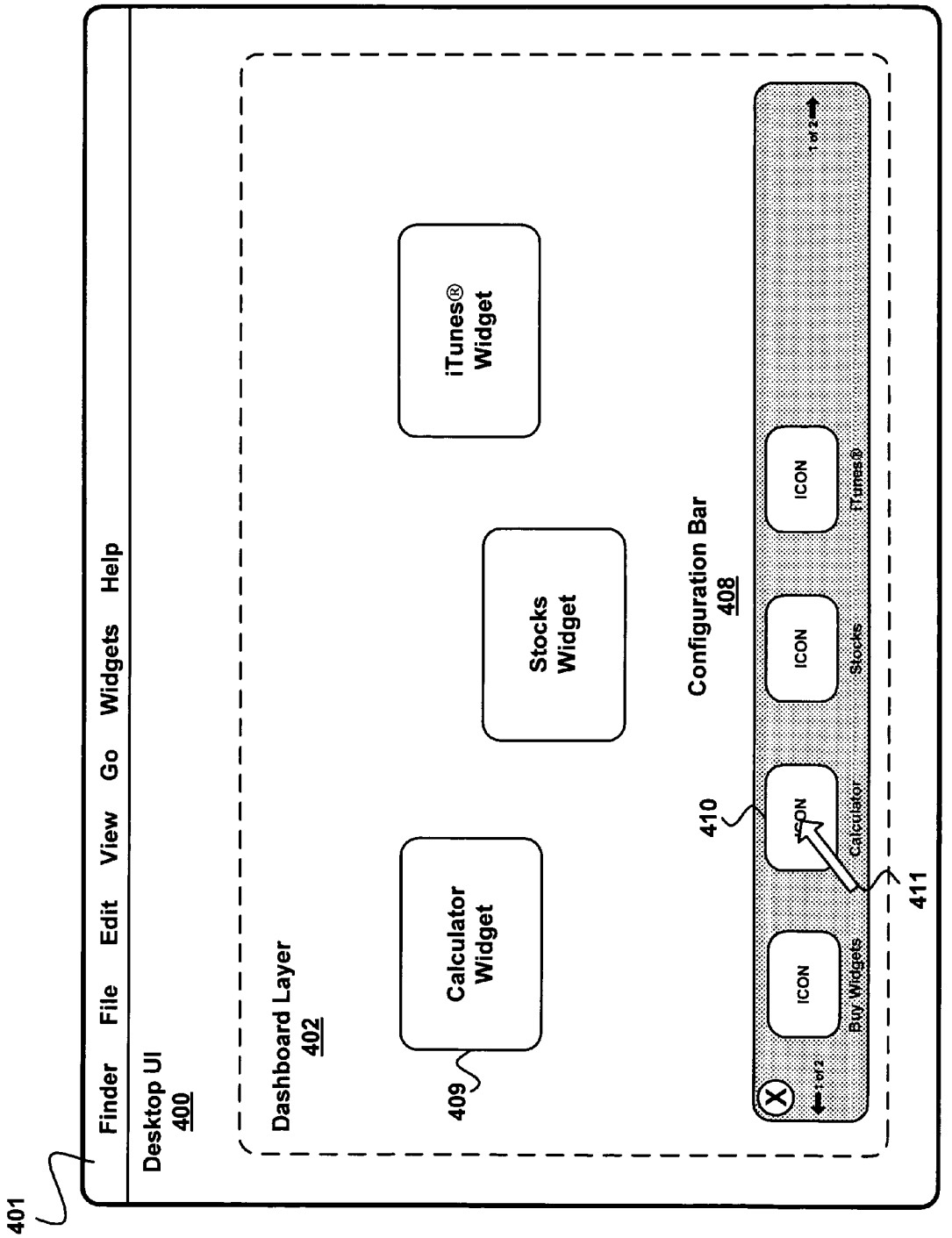

401
Finder File Edit View Go Widgets Help
Desktop UI
400
Dashboard Layer
402
Calculator Widget
409
Stocks Widget
iTunes® Widget
Configuration Bar
408
410
411
ICON
ICON
ICON
Buy Widgets
Calculator
Stocks
iTunes®
1 of 2

Fig. 4d

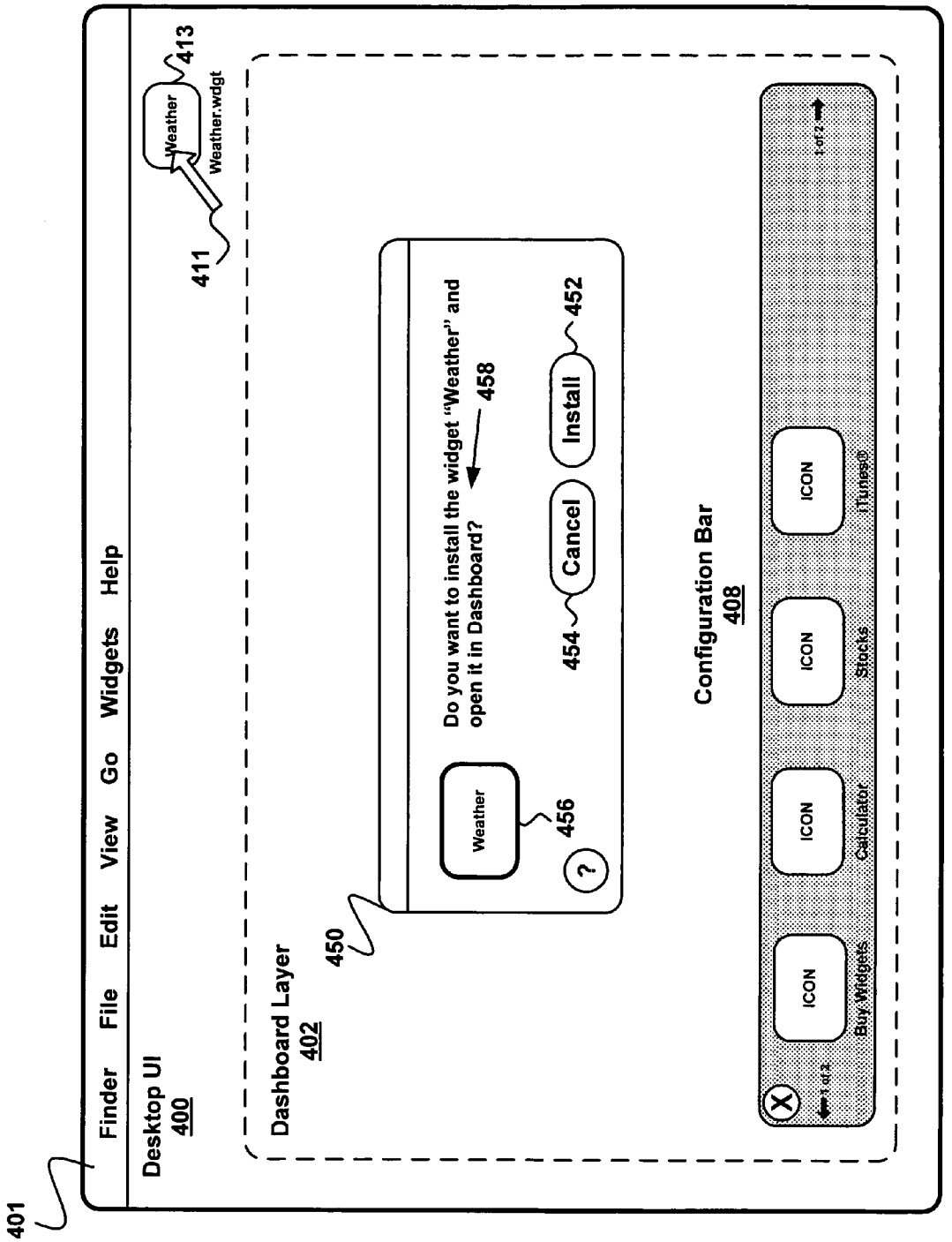

401
Finder File Edit View Go Widgets Help
Desktop UI
400
Dashboard Layer
402
Weather
Weather.wdgt
413
411
450
Do you want to install the widget "Weather" and open it in Dashboard?
458
Weather
456
Cancel
454
Install
452
Configuration Bar
408
ICON
ICON
ICON
ICON
Buy Widgets
Calculator
Stocks
iTunes®
1 of 2

Fig. 4e

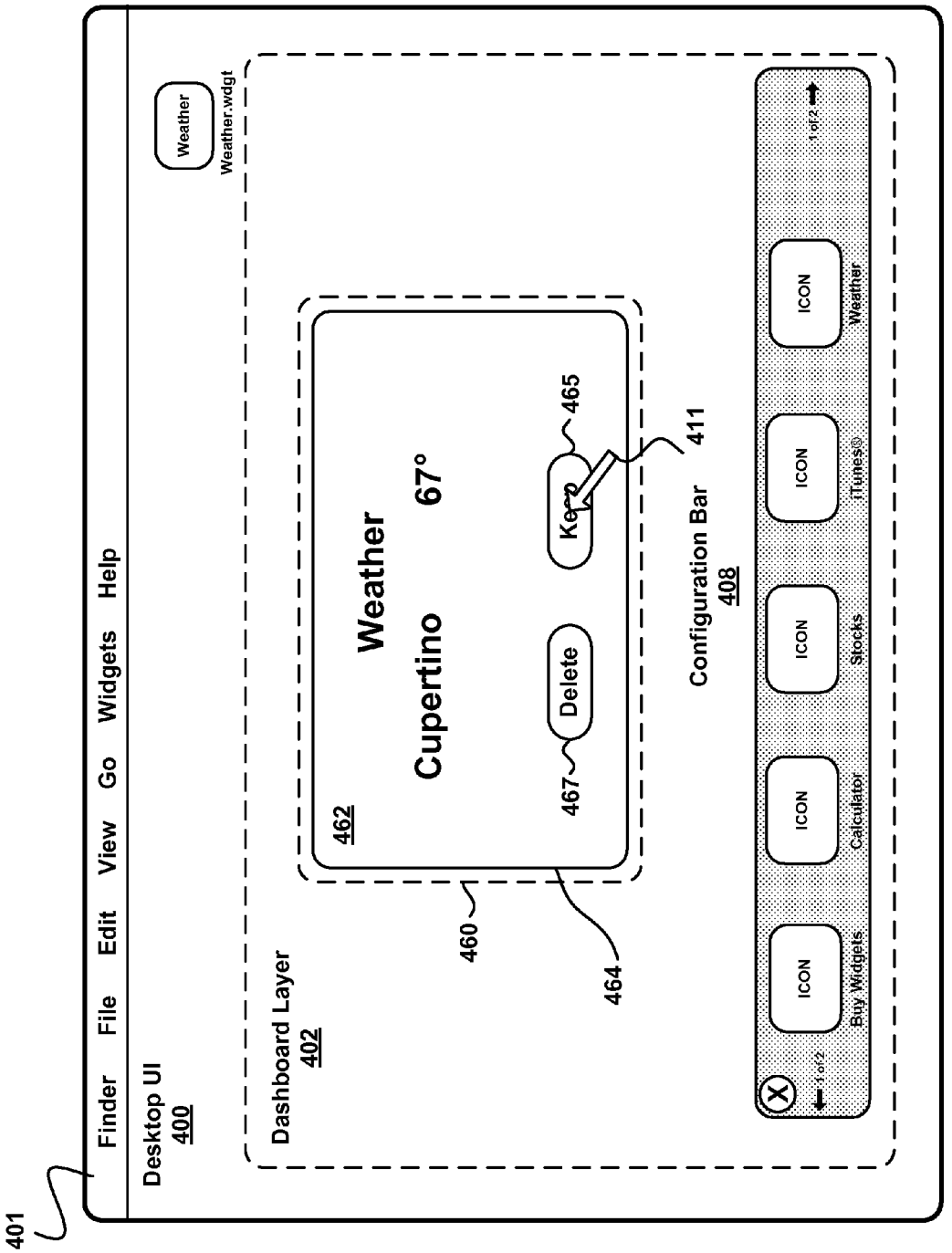

401
Finder File Edit View Go Widgets Help
Desktop UI
400
Weather
Weather.wdgt
Dashboard Layer
402
462
Weather
Cupertino
67°
Delete
467
460
464
465
411
Configuration Bar
408
ICON
Buy Widgets
ICON
Calculator
ICON
Stocks
ICON
iTunes®
ICON
Weather
1 of 2

Fig. 4f

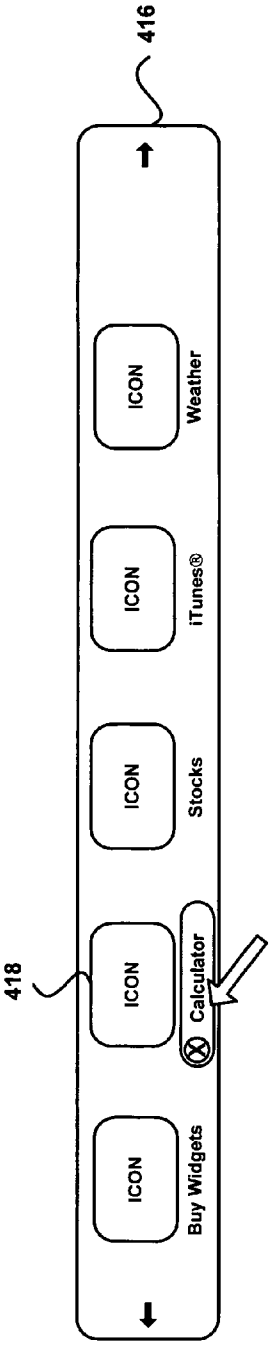


Fig. 4g

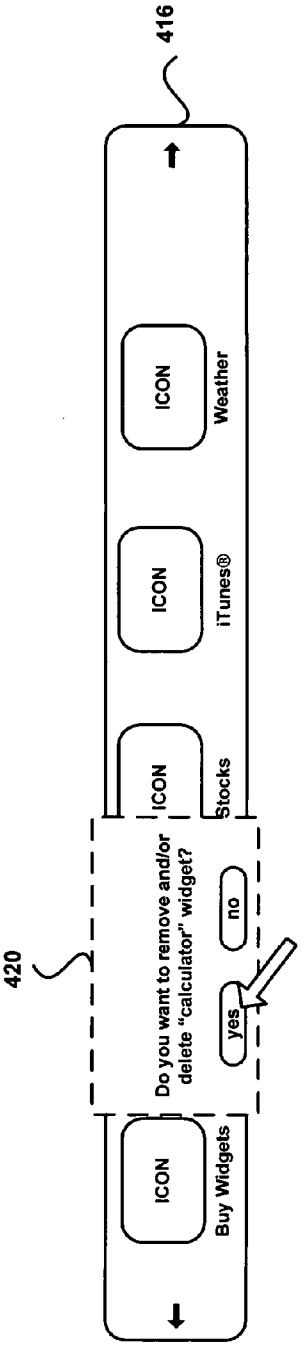


Fig. 4h

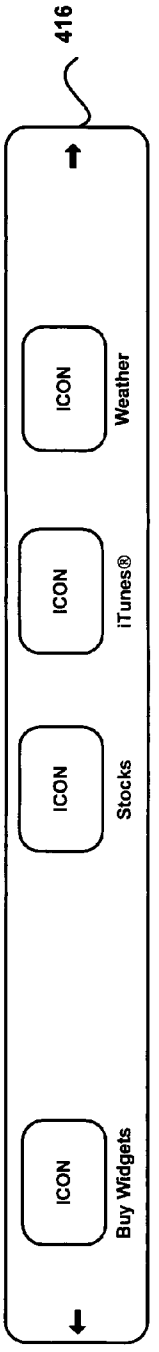


Fig. 4i

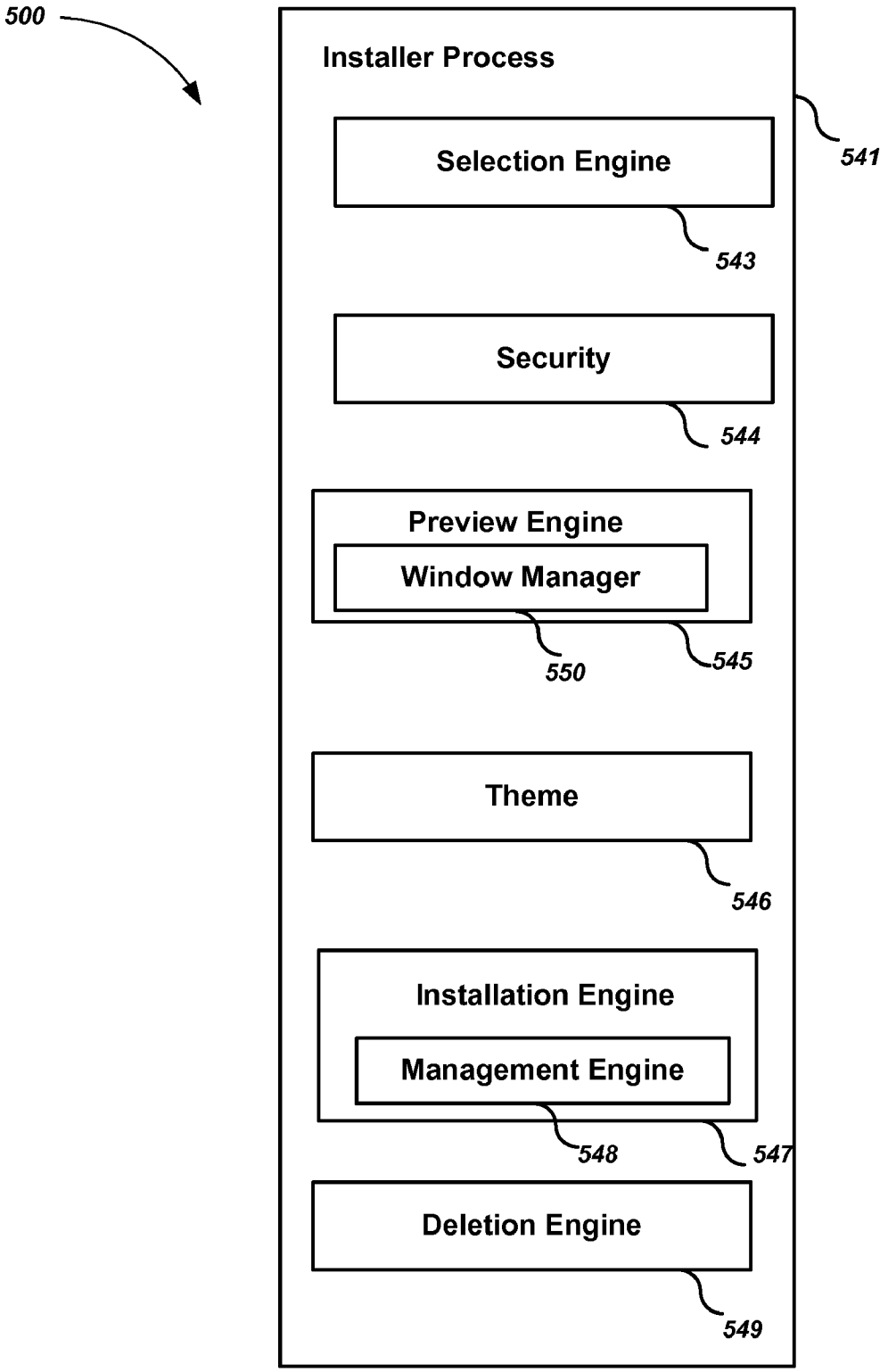

500
Installer Process
541
Selection Engine
543
Security
544
Preview Engine
Window Manager
550
545
Theme
546
Installation Engine
Management Engine
548
547
Deletion Engine
549

Fig. 5

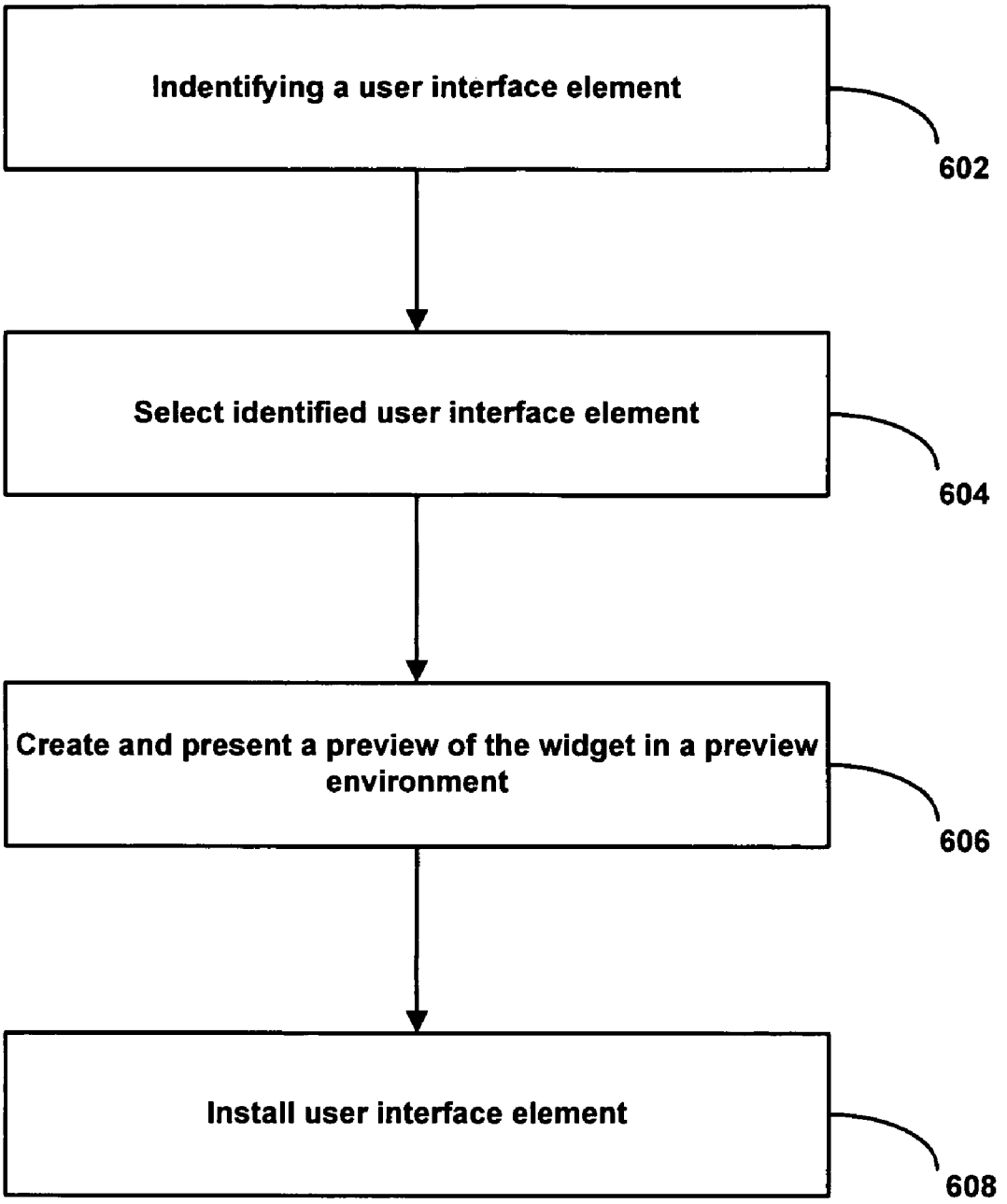

Indentifying a user interface element
602
Select identified user interface element
604
Create and present a preview of the widget in a preview environment
606
Install user interface element
608

Fig. 6

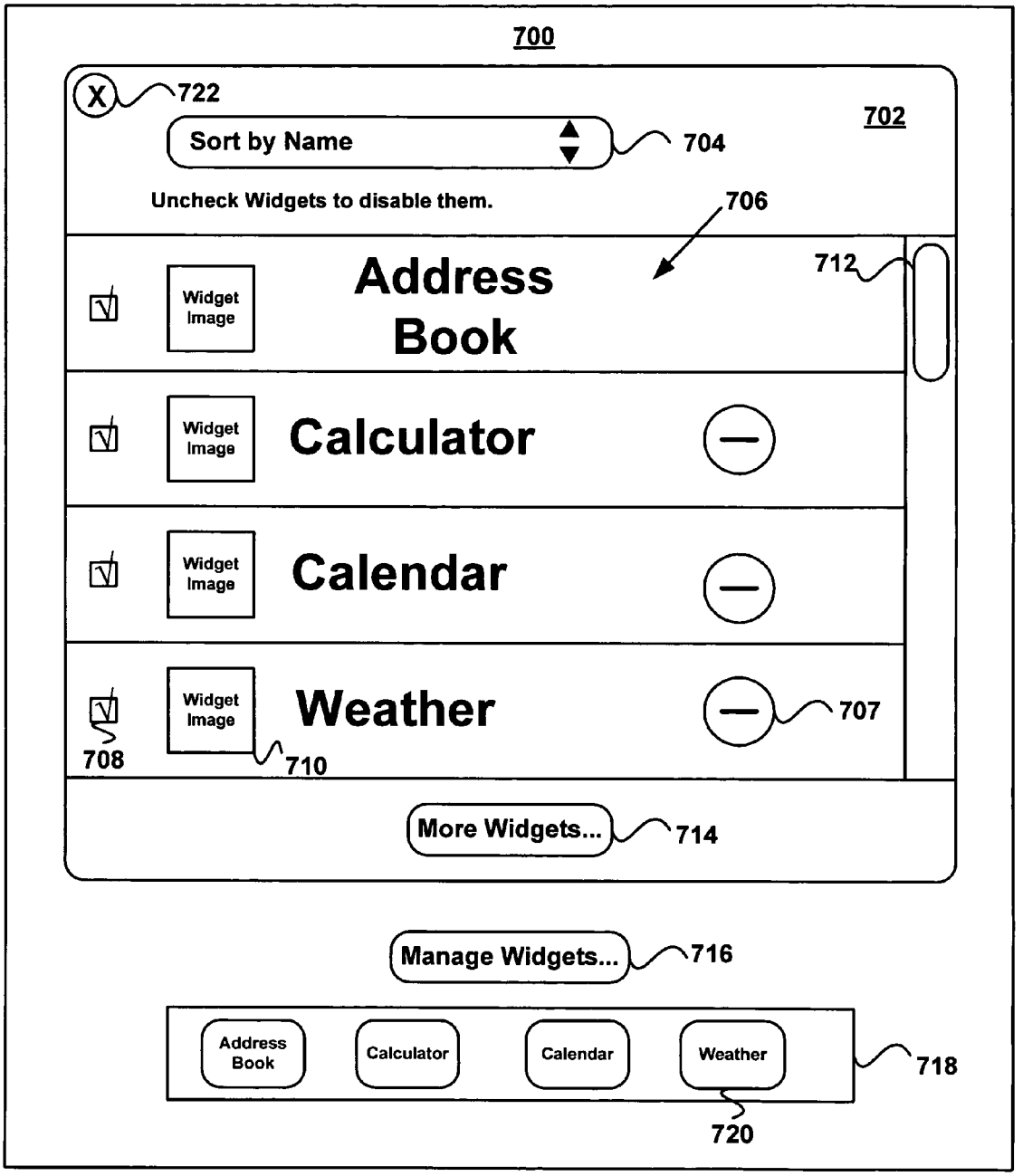

700
X
722
702
Sort by Name
704
Uncheck Widgets to disable them.
706
712
Widget Image
Address Book
Widget Image
Calculator
Widget Image
Calendar
Widget Image
Weather
707
708
710
More Widgets...
714
Manage Widgets...
716
Address Book
Calculator
Calendar
Weather
718
720

Fig. 7a

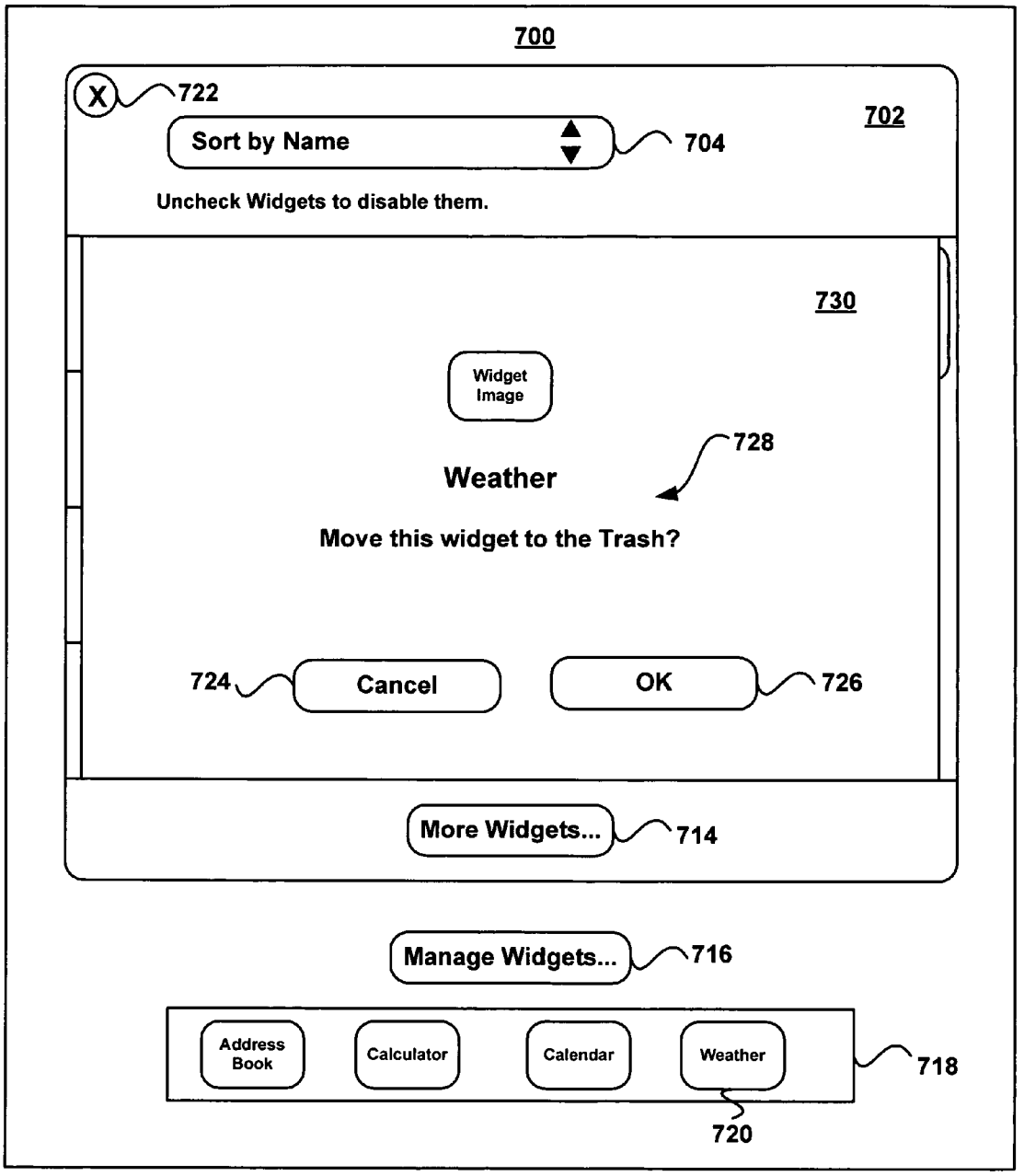

700
X
722
Sort by Name
704
702
Uncheck Widgets to disable them.
730
Widget Image
728
Weather
Move this widget to the Trash?
724
Cancel
OK
726
More Widgets...
714
Manage Widgets...
716
Address Book
Calculator
Calendar
Weather
718
720

Fig. 7b

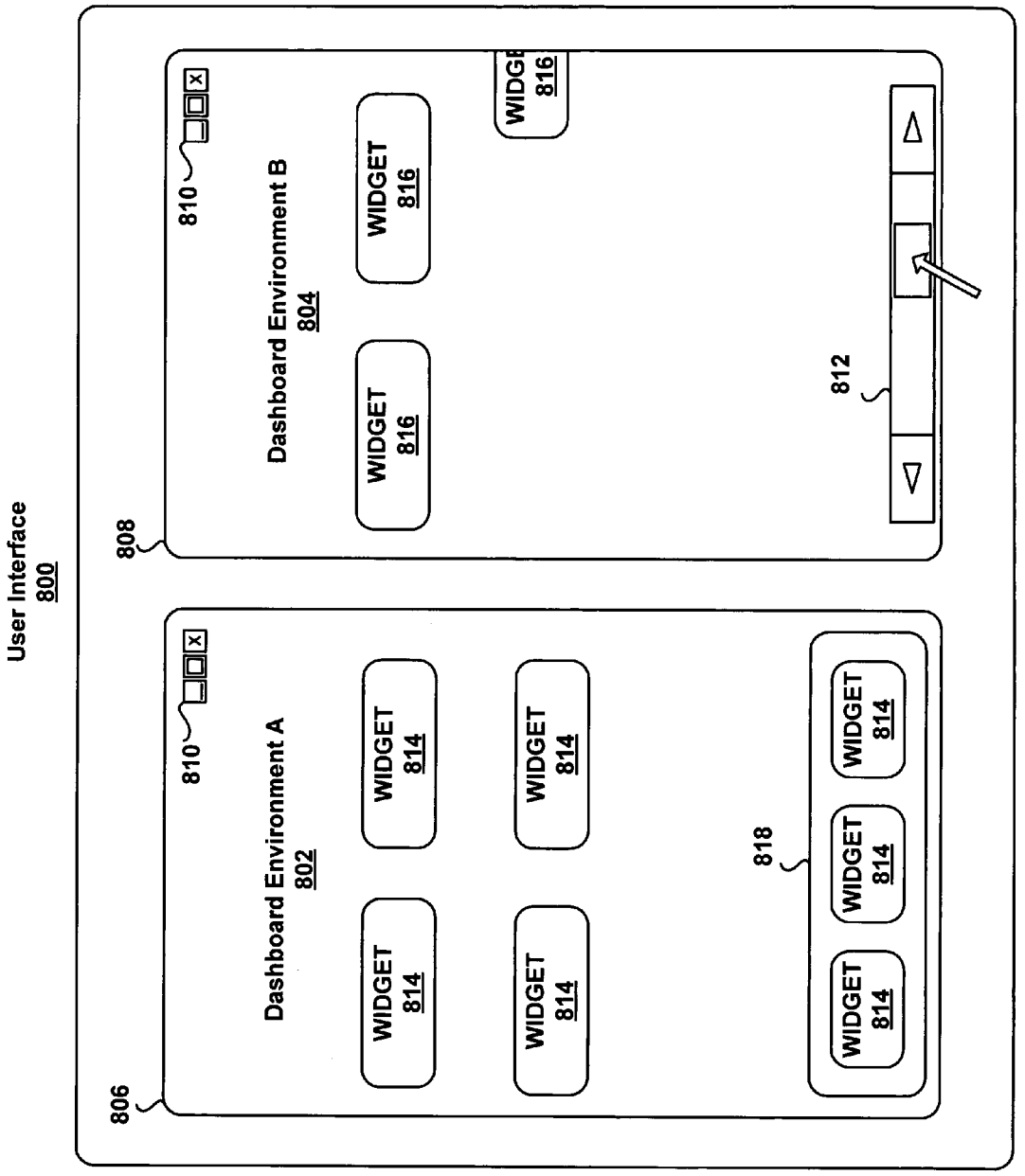

User Interface
800
806
808
810
Dashboard Environment A
802
Dashboard Environment B
804
WIDGET
814
WIDGET
816
812
818

Fig. 8

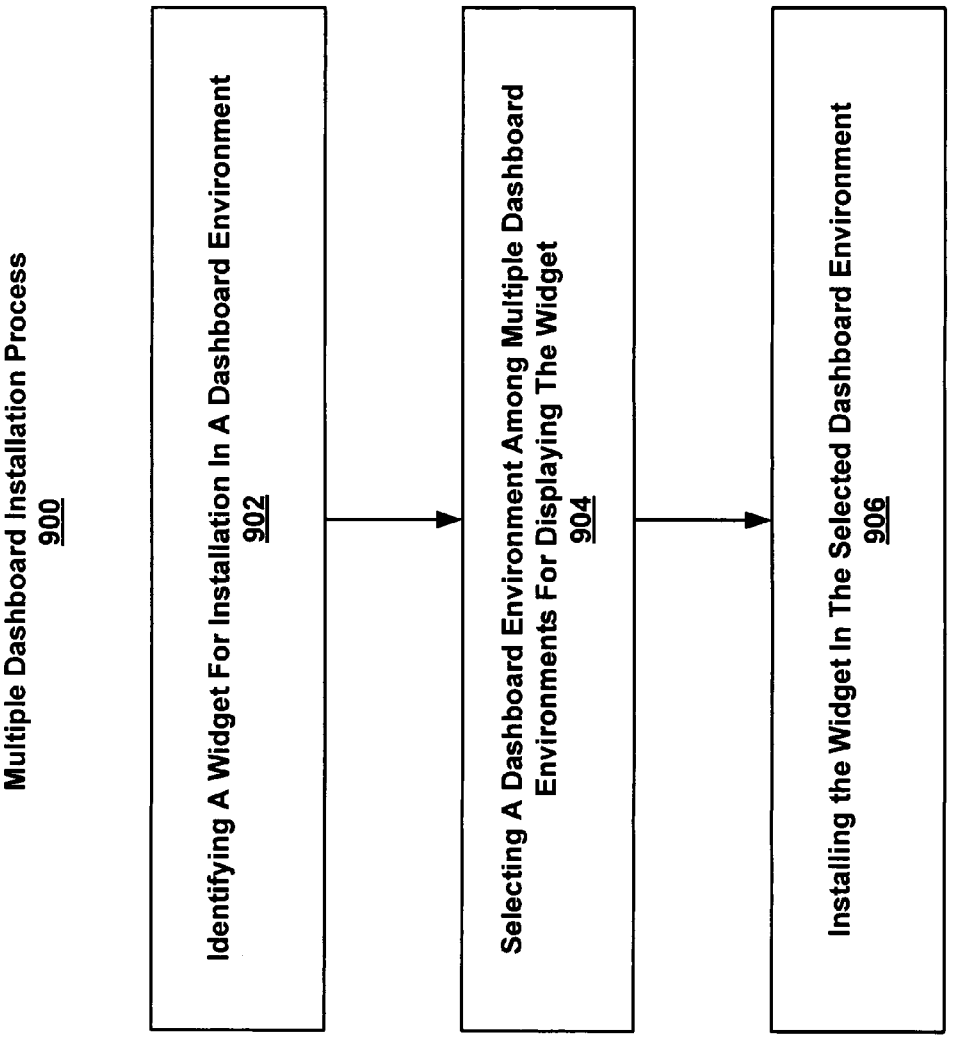

Multiple Dashboard Installation Process
900
Identifying A Widget For Installation In A Dashboard Environment
902
Selecting A Dashboard Environment Among Multiple Dashboard Environments For Displaying The Widget
904
Installing the Widget In The Selected Dashboard Environment
906

Fig. 9

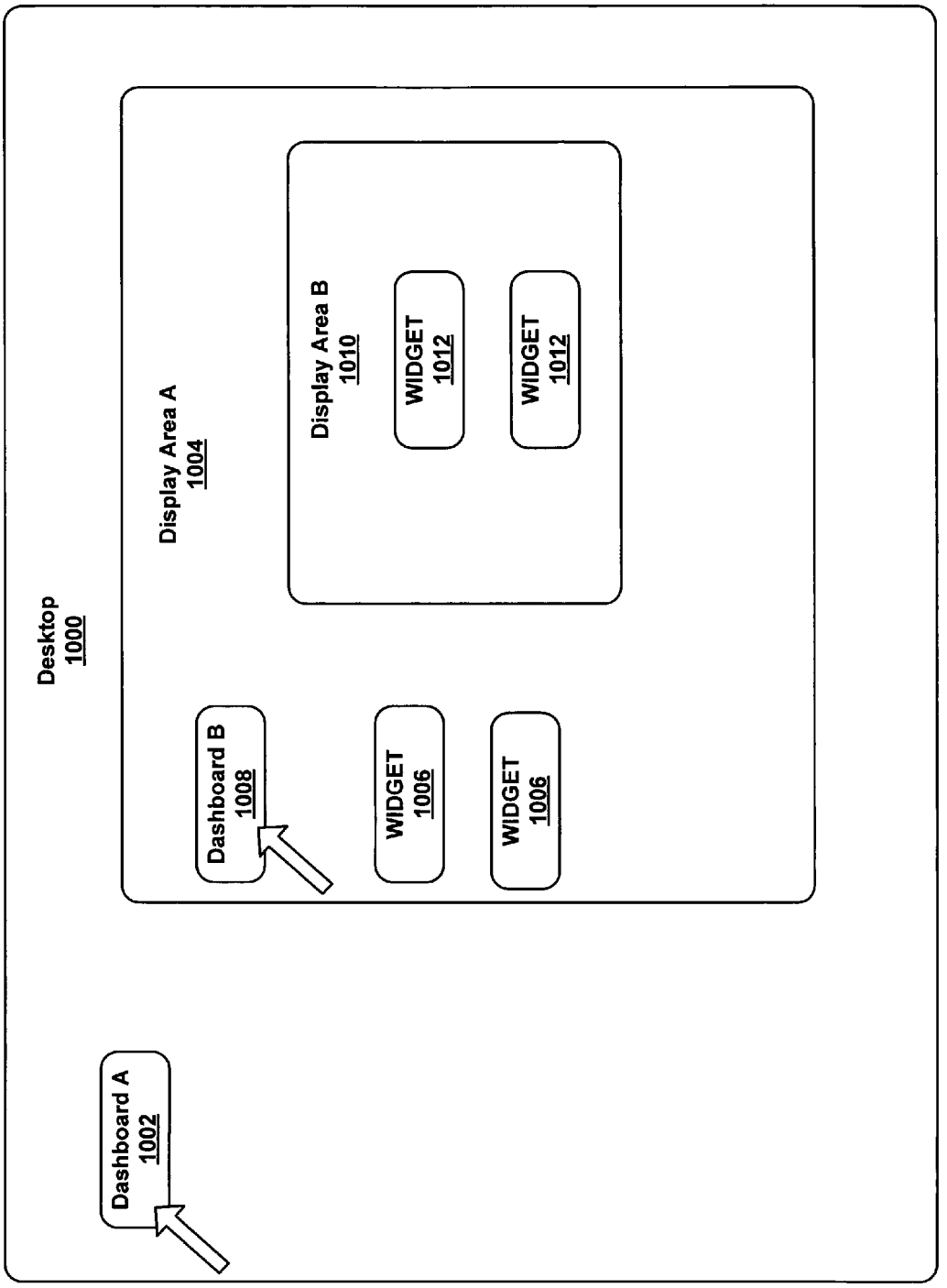

Desktop
1000
Dashboard A
1002
Display Area A
1004
Dashboard B
1008
WIDGET
1006
WIDGET
1006
Display Area B
1010
WIDGET
1012
WIDGET
1012

Fig. 10

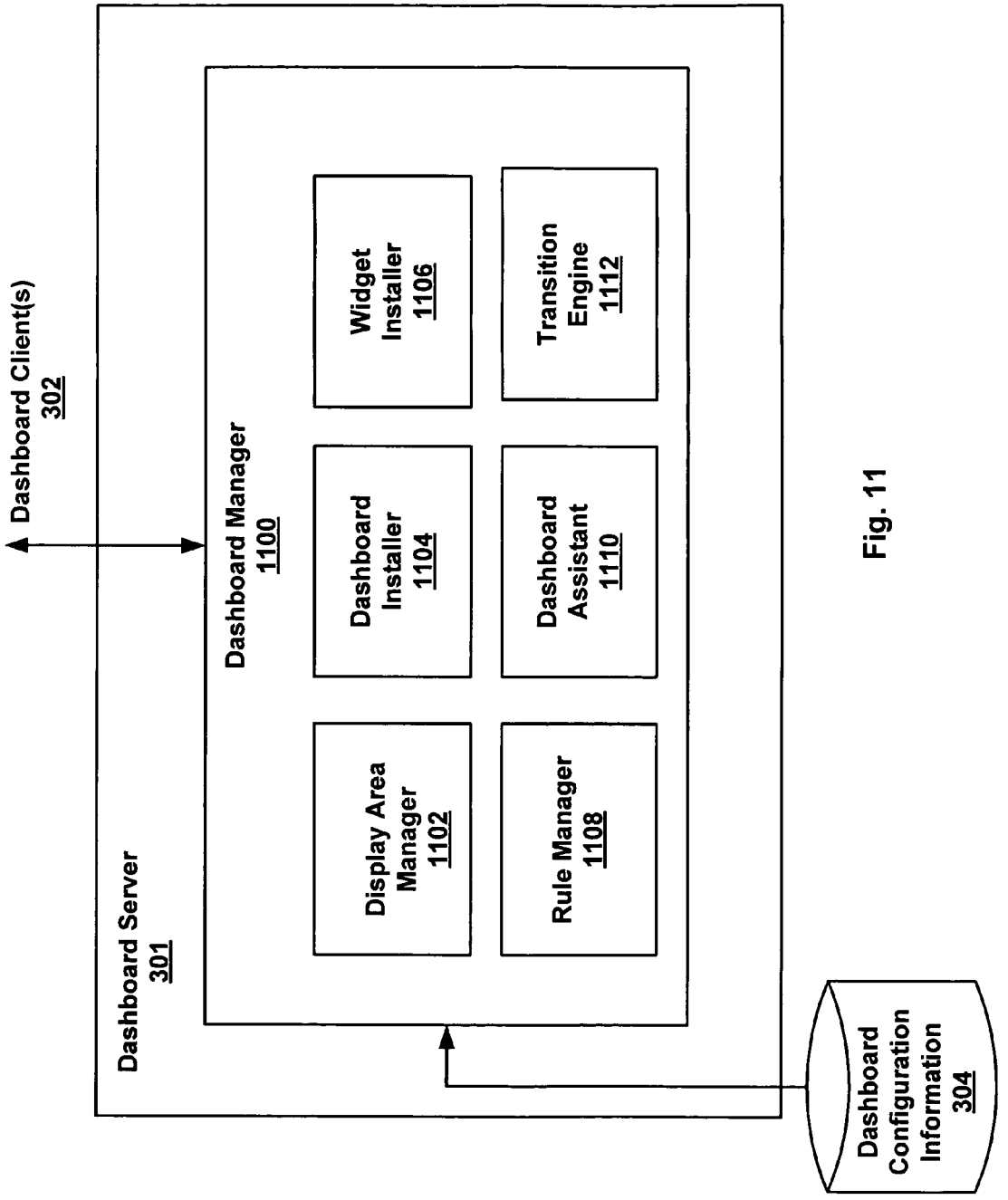

Dashboard Client(s)
302
Dashboard Server
301
Dashboard Manager
1100
Widget Installer
1106
Transition Engine
1112
Dashboard Installer
1104
Dashboard Assistant
1110
Display Area Manager
1102
Rule Manager
1108
Dashboard Configuration Information
304

Fig. 11

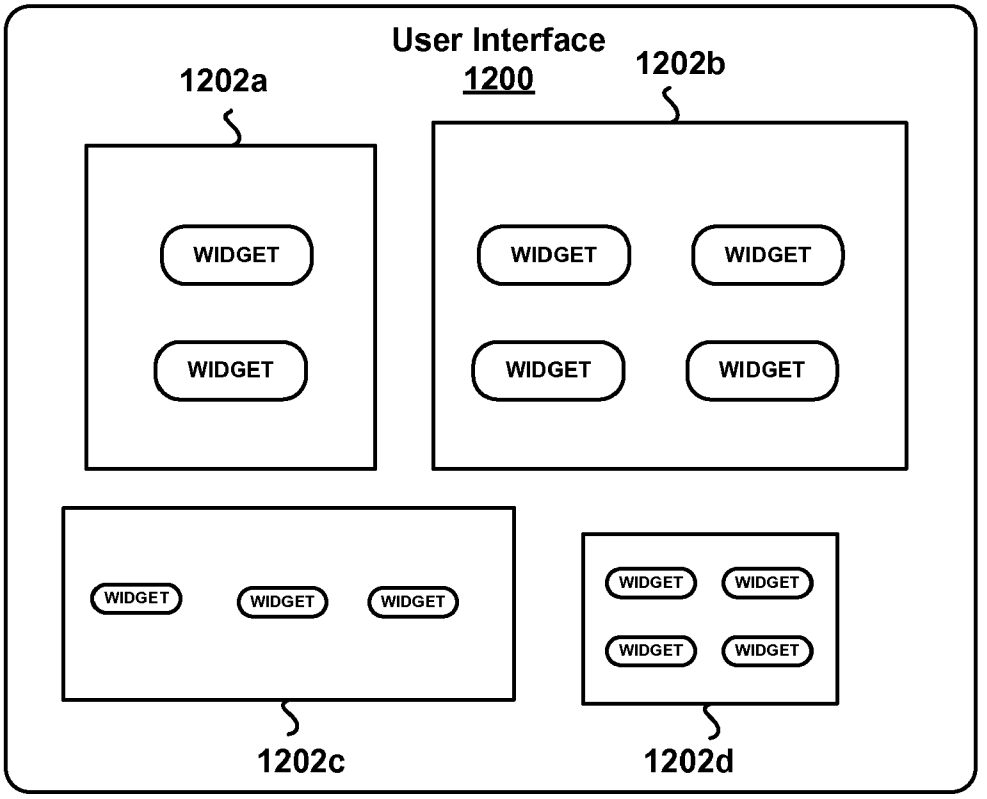

User Interface
1200
1202a
1202b
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
WIDGET
1202c
1202d

Fig. 12

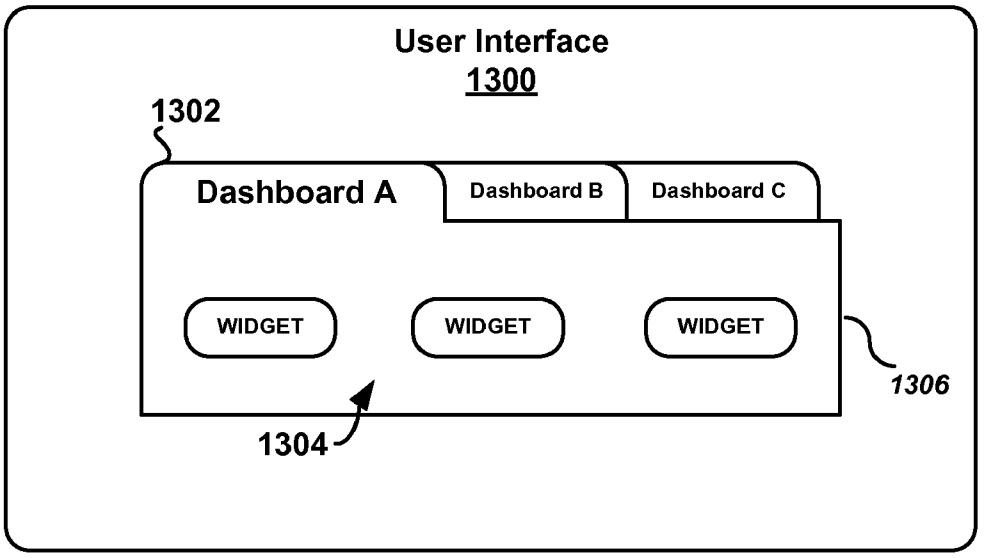

User Interface
1300
1302
Dashboard A
Dashboard B
Dashboard C
WIDGET
WIDGET
WIDGET
1306
1304

Fig. 13

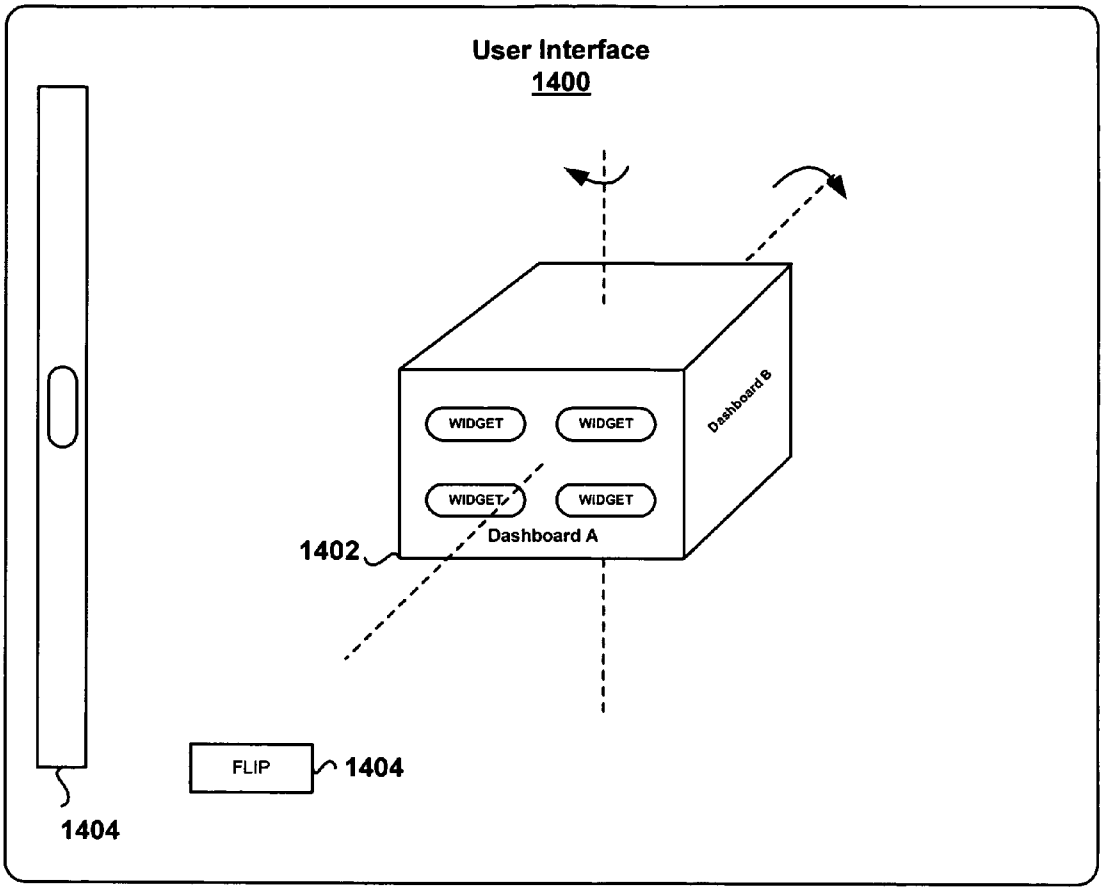

User Interface
1400
WIDGET
WIDGET
WIDGET
WIDGET
Dashboard A
Dashboard B
1402
FLIP
1404
1404

Fig. 14

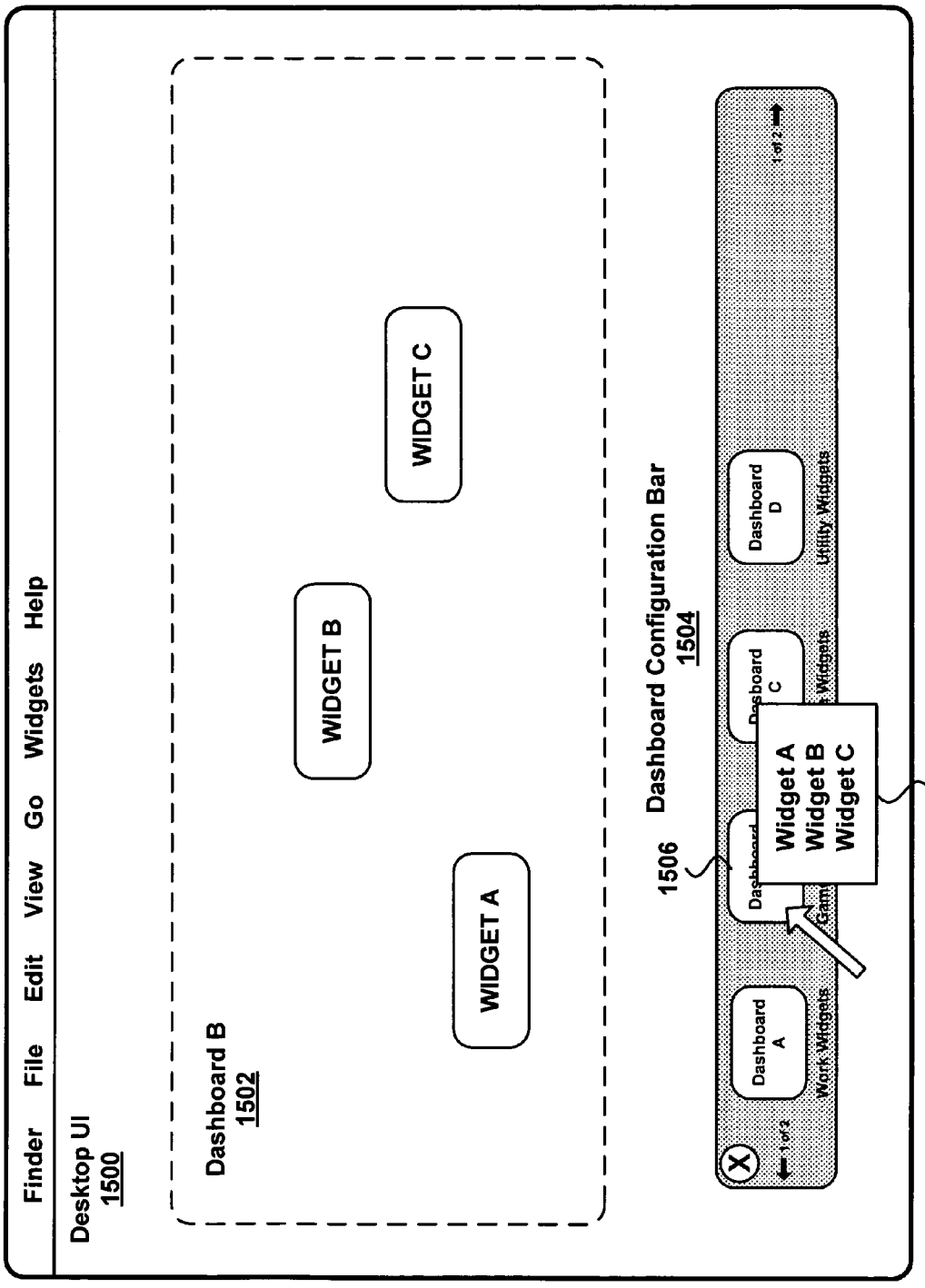

Finder File Edit View Go Widgets Help
Desktop UI
1500
Dashboard B
1502
WIDGET A
WIDGET B
WIDGET C
Dashboard Configuration Bar
1504
1506
1508
Widget A
Widget B
Widget C
Dashboard A
Work Widgets
Dashboard C
Dashboard D
Utility Widgets
1 of 2

Fig. 15

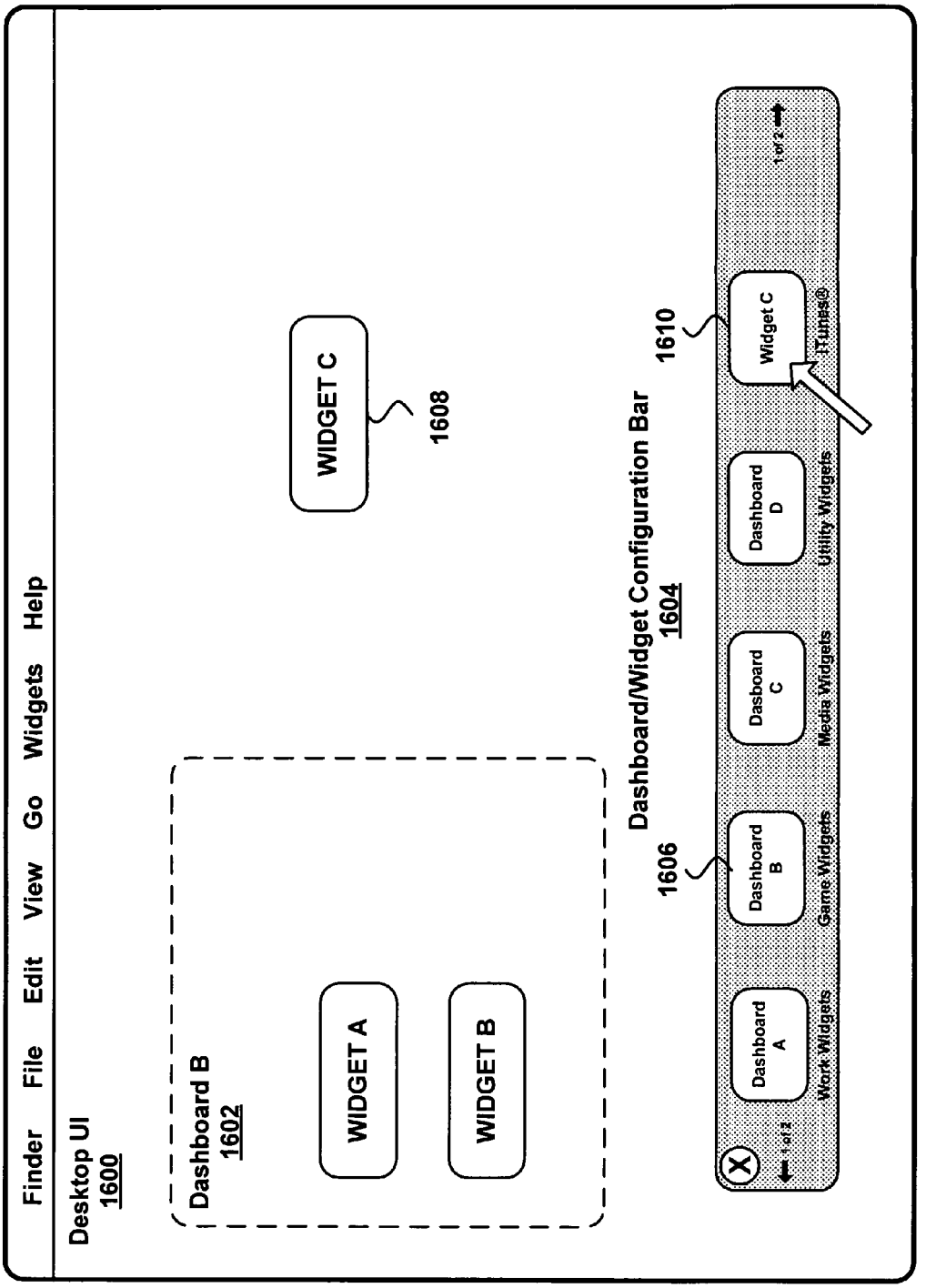

Finder File Edit View Go Widgets Help
Desktop UI
1600
Dashboard B
1602
WIDGET A
WIDGET B
WIDGET C
1608
Dashboard/Widget Configuration Bar
1604
1606
1610
Dashboard A
Dashboard B
Dasboard C
Dashboard D
Widget C
1 of 2
1 of 2
Work Widgets
Game Widgets
Media Widgets
Utility Widgets
iTunes®

Fig. 16

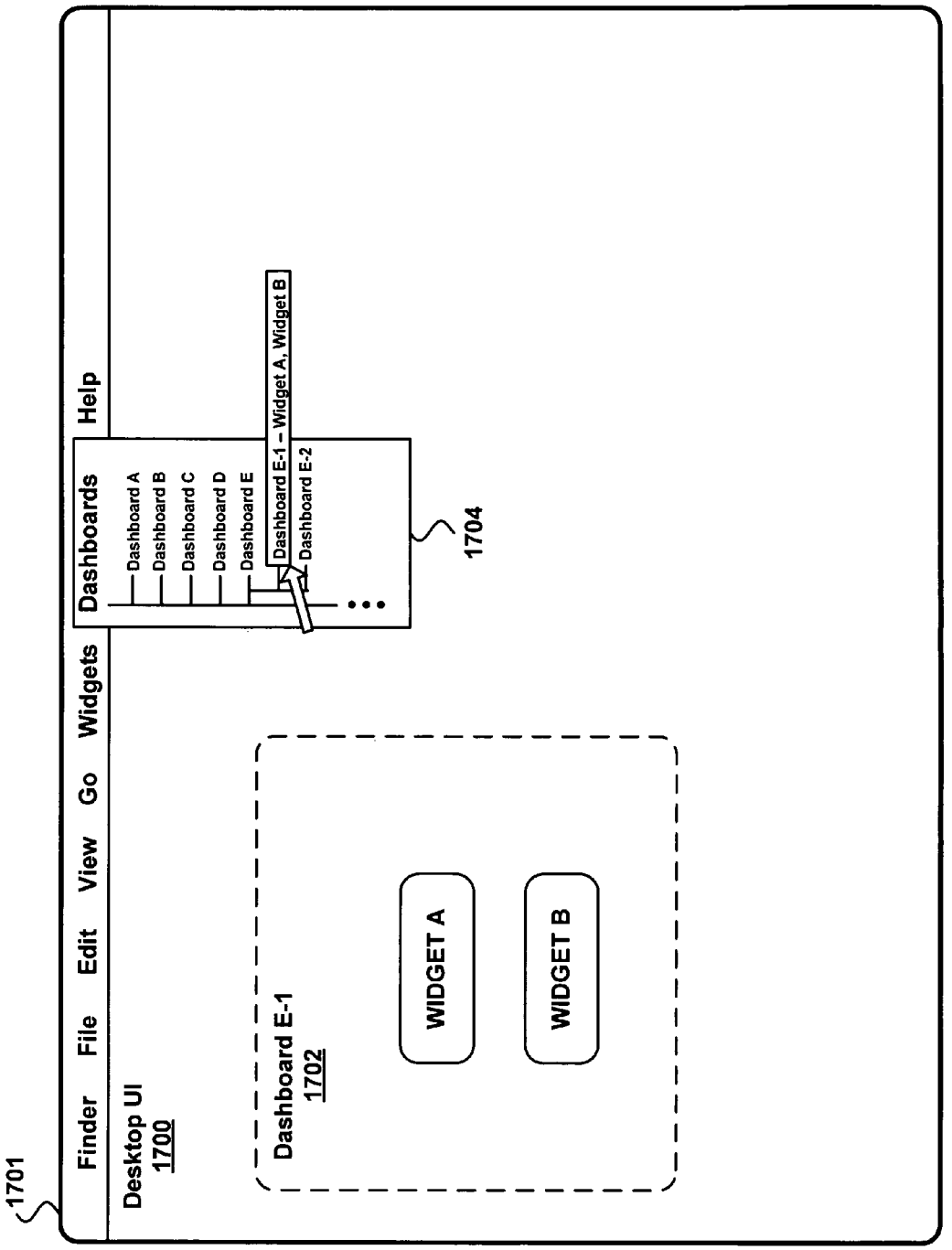

1701
Finder File Edit View Go Widgets Dashboards Help
Desktop UI
1700
Dashboard E-1
1702
WIDGET A
WIDGET B
Dashboard A
Dashboard B
Dashboard C
Dashboard D
Dashboard E
Dashboard E-1 – Widget A, Widget B
Dashboard E-2
1704

Fig. 17

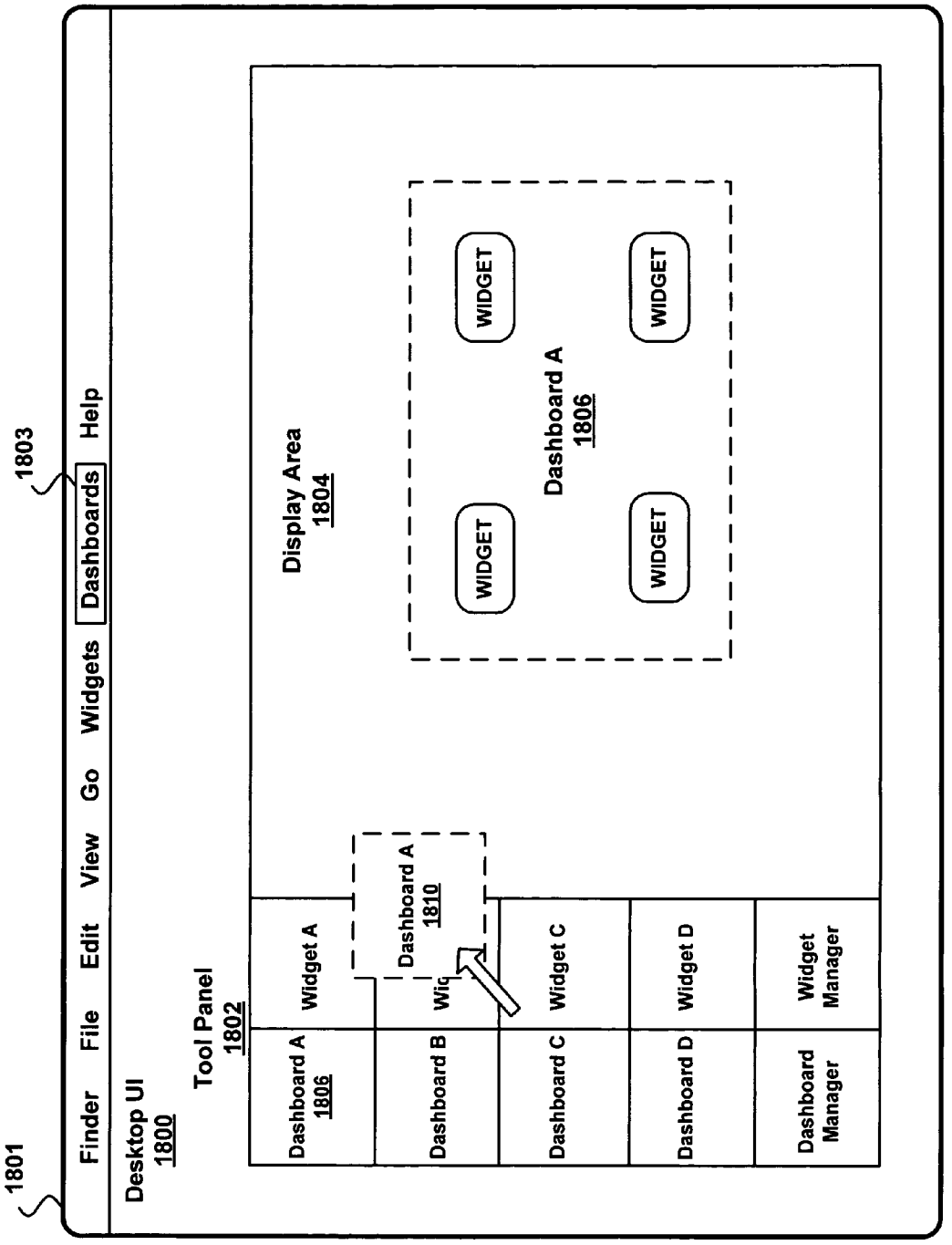

1801
1803
Finder
File
Edit
View
Go
Widgets
Dashboards
Help
Desktop UI
1800
Tool Panel
1802
Dashboard A
1806
Dashboard B
Dashboard C
Dashboard D
Dashboard Manager
Widget A
Dashboard A
1810
Widget C
Widget D
Widget Manager
Display Area
1804
Dashboard A
1806
WIDGET
WIDGET
WIDGET
WIDGET

Fig. 18

MULTIPLE DASHBOARDS

RELATED APPLICATIONS

This patent application claims the benefit of priority from jointly owned and U.S. Provisional Patent Application No. 60/737,942, entitled "Multiple Dashboards," filed Nov. 18, 2005, which provisional patent application is incorporated by reference herein in its entirety.

This application is related to the following jointly owned and patent applications, each incorporated herein by reference in its entirety:

- U.S. Provisional Patent Application No. 60/583,125, for "Procedurally Expressing Graphic Objects for Web Pages," filed Jun. 25, 2004;
- U.S. patent application Ser. No. 10/874,829, for "User Interface for Assisting in the Installation of an Asset," filed Jun. 22, 2004;
- U.S. patent application Ser. No. 10/877,968, for "Unified Interest Layer For User Interface," filed Jun. 25, 2004;
- U.S. patent application Ser. No. 11/145,561, for "Application Clipper," filed Jun. 3, 2005;
- U.S. patent application Ser. No. 11/145,560, for "Web View Applications," filed Jun. 3, 2005;
- U.S. patent application Ser. No. 11/145,023, for "Clip View Applications," filed Jun. 3, 2005;
- U.S. patent application Ser. No. 11/148,010, for "Preview and Installation of User Interface Elements in a Display Environment," filed Jun. 7, 2005;
- U.S. Provisional Patent Application No. 60/734,016, for "Preview Including Theme Based Installation of User Interface Elements In A Display Environment," filed Nov. 4, 2005;
- U.S. Provisional Patent Application No. 60/730,956, for "Widget Security," filed Oct. 27, 2005;
- U.S. patent application Ser. No. 11/282,110, for "Preview Including Theme Based Installation of User Interface Elements In A Display Environment," filed Nov. 16, 2005; and
- U.S. Provisional Patent Application No. 60/737,899, for "Management of User Interface Elements In A Display Environment," filed Nov. 18, 2005.

TECHNICAL FIELD

The disclosed implementations relate generally to graphical user interfaces.

BACKGROUND

A hallmark of modern graphical user interfaces is that they allow a large number of graphical objects or items to be displayed on a display screen at the same time. Leading personal computer operating systems, such as Apple Mac OS®, provide user interfaces in which a number of windows can be displayed, overlapped, resized, moved, configured, and reformatted according to the needs of the user or application. Taskbars, menus, virtual buttons and other user interface elements provide mechanisms for accessing and activating windows even when they are hidden behind other windows.

Although users appreciate interfaces that can present information on a screen via multiple windows, the result can be overwhelming. For example, users may find it difficult to navigate to a particular user interface element or to locate a desired element among a large number of onscreen elements. The problem is further compounded when user interfaces allow users to position elements in a desired arrangement, including overlapping, minimizing, maximizing, and the like. Although such flexibility may be useful to the user, it can result in a cluttered display screen. Having too many elements displayed on the screen can lead to "information overload," thus inhibiting the user to efficiently use the computer equipment.

Many of the deficiencies of conventional user interfaces can be reduced using "widgets." Generally, widgets are user interface elements that include information and one or more tools (e.g., applications) that let the user perform common tasks and provide fast access to information. Widgets can perform a variety of tasks, including without limitation, communicating with a remote server to provide information to the user (e.g., weather report), providing commonly needed functionality (e.g., a calculator), or acting as an information repository (e.g., a notebook). Widgets can be displayed and accessed through a user interface, such as a "dashboard layer," which is also referred to as a "dashboard." Widgets and dashboards are described in co-pending U.S. patent application Ser. No. 10/877,968, entitled "Unified Interest Layer For User Interface."

Due to the large number of widgets available to a user, a virtual desktop or dashboard can become cluttered and disorganized, making it difficult for the user to quickly locate and access a widget. Moreover, a user may only need to access a subset of widgets available on the desktop or dashboard for a given task.

SUMMARY

Systems, methods, computer-readable mediums, user interfaces and other implementations are disclosed for organizing, managing and presenting widgets in display areas associated with multiple dashboard environments.

In some implementations, a method includes: providing a first dashboard layer; providing a second dashboard layer; and providing a transition between the first dashboard layer and the second dashboard layer.

In some implementations, a user interface includes: a first display area associated with a first dashboard environment. The first display area is configured for displaying at least one widget from a first set of widgets. The system also includes a second display area associated with a second dashboard environment. The second display area is configured for displaying at least one widget from a second set of widgets.

In some implementations, a method includes: identifying a widget for installation in a dashboard environment; selecting the dashboard environment from a number of dashboard environments; and installing the widget in the selected dashboard environment.

In some implementations, a method includes: receiving a widget for installation in a dashboard environment; previewing the widget in a preview environment; and installing the widget after the preview in the dashboard environment.

In some implementations, a method includes: providing a number of widgets for display in one or more display areas associated with one or more dashboard environments; determining a first set of widgets to be displayed in a first display area of a first dashboard environment; installing the first set of widgets in the first dashboard environment; determining a second set of widgets to be displayed in a second display area associated with a second dashboard environment; and installing the second group of widgets in the second dashboard environment.

In some implementations, a user interface includes: a desktop environment; a first dashboard environment, configured

to be invoked at least from the desktop environment, and including one or more widgets; and a second dashboard environment, configured to be invoked from at least a first display area associated with the first dashboard environment, and including one or more widgets.

In some implementations, a method includes: providing a desktop environment in a user interface device; defining a first dashboard environment, configured to be invoked from the desktop environment, and including one or more widgets; and defining a second dashboard environment, configured to be invoked from at least a first display area associated with the first dashboard environment, and including one or more widgets.

In some implementations, a method includes: identifying one or more widgets for installation in a dashboard environment; determining if an existing dashboard environment is available for installing at least one widget; and if no existing dashboard environment is available, installing a new dashboard environment.

In some implementations, a dashboard manager includes: a dashboard installer configured for installing multiple dashboard environments; and a display area manager configured for presenting display areas associated with the dashboard environments on a user interface, and for managing interactions with the display areas.

Other implementations are disclosed which are directed to systems, methods, computer-readable mediums and user interfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of an exemplary hardware architecture for implementing multiple dashboards.

FIG. **2** is a flow diagram of an exemplary process for activating and using a dashboard.

FIG. **3** is a block diagram of an exemplary software architecture for implementing multiple dashboards.

FIG. **4***a* is a screen shot depicting an exemplary desktop user interface prior to activation of a dashboard.

FIG. **4***b* is a screen shot depicting an exemplary initial state for a dashboard.

FIG. **4***c* is a screen shot depicting an exemplary configuration bar for a dashboard.

FIG. **4***d* is a screen shot depicting user selection of a widget from the configuration bar shown in FIG. **4***c*.

FIG. **4***e* is an exemplary screen shot depicting an installation confirmation.

FIG. **4***f* is an exemplary screen shot depicting a preview of a user interface element that has been selected to be installed.

FIGS. **4***g*-**4***i* illustrate deletion of widgets from a configuration bar.

FIG. **5** is a block diagram of an exemplary installer process.

FIG. **6** is a flow diagram of an exemplary process for installing a user interface element in a display environment.

FIG. **7***a* illustrates an exemplary user interface for a widget manager.

FIG. **7***b* illustrates an exemplary widget manager overlay for requesting a user to confirm the deletion of a widget.

FIG. **8** illustrates an exemplary user interface including multiple display areas associated with multiple dashboard environments.

FIG. **9** is a flow diagram of an exemplary process for installing widgets in multiple dashboard environments.

FIG. **10** illustrates nesting display areas associated with dashboard environments.

FIG. **11** is a block diagram of an exemplary dashboard manager for managing various processes associated with multiple dashboard environments.

FIG. **12** illustrates an exemplary dynamic tiling scheme for organizing multiple dashboards on a user interface.

FIG. **13** illustrates an exemplary tab control scheme for organizing multiple dashboards on a user interface.

FIG. **14** illustrates an exemplary geometric scheme for organizing multiple dashboards on a user interface.

FIG. **15** illustrates an exemplary dashboard configuration bar

FIG. **16** illustrates an exemplary dashboard/widget configuration bar.

FIG. **17** illustrates an exemplary menu scheme for organizing multiple dashboards and widgets.

FIG. **18** illustrates an exemplary tool panel scheme for installing dashboards and widgets.

DETAILED DESCRIPTION

Hardware Architecture

FIG. **1** is a block diagram of a hardware architecture **100** for implementing multiple dashboards. The architecture **100** includes a personal computer **102** coupled to a remote server **107** via a network interface **116** and a network connection **108** (e.g., local area network, wireless network, Internet, intranet, etc.). The computer **102** generally includes a processor **103**, memory **105**, one or more input devices **114** (e.g., keyboard, mouse, etc.) and one or more output devices **115** (e.g., a display device). A user interacts with the architecture **100** via the input and output devices **114**, **115**.

The computer **102** also includes a local storage device **106** and a graphics module **113** (e.g., graphics card) for storing information and generating graphical objects, respectively. The local storage device **106** can be a computer-readable medium. The term "computer-readable medium" refers to any medium that participates in providing instructions to a processor for execution, including without limitation, non-volatile media (e.g., optical or magnetic disks), volatile media (e.g., memory) and transmission media. Transmission media includes, without limitation, coaxial cables, copper wire, fiber optics, and computer buses. Transmission media can also take the form of acoustic, light or radio frequency waves.

While dashboards and widgets are described herein with respect to a personal computer **102**, it should be apparent that the disclosed implementations can be incorporated in, or integrated with, any electronic device that is capable of using widgets, including without limitation, portable and desktop computers, servers, electronics, media players, game devices, mobile phones, email devices, personal digital assistants (PDAs), televisions, etc.

A multiple dashboard system and method for managing and displaying multiple dashboards and widgets can be implemented as one or more plug-ins that are installed and run on the personal computer **102**. The plug-ins are configured to interact with an operating system (e.g., MAC OS® X, WINDOWS XP, LINUX, etc.) and to perform the various dashboard and widget functions, as described with respect of FIGS. **2-13**. A multiple dashboard system and method can also be implemented as one or more software applications running on the computer **102**. In some implementations, a multiple dashboard system can be another widget that is configurable to communicate with other widgets, applications and/or operating systems. A multiple dashboard system and method can also be characterized as a framework or model that can be implemented on various platforms and/or

networks (e.g., client/server networks, stand-alone computers, portable electronic devices, mobile phones, etc.), and/or embedded or bundled with one or more software applications (e.g., email, media player, browser, etc.).

For illustrative purposes, in the following description the invention is described as a feature of an operating system for use in installing widgets in multiple dashboards; however, one skilled in the art will recognize that the techniques of the present invention can be implemented in other contexts as well, including those described above, to install other elements, and in other environments including environments associated with applications or operating systems. Examples of other environments include e-mail environments, desktop environments, application environments, hand-held display environments, and other display environments.

Dashboard Overview

FIG. **2** is a flow diagram of an implementation of a process for activating and using a dashboard. A dashboard layer (also referred to herein as a "unified interest layer" or "dashboard") is used to manage and display widgets. A user can invoke a dashboard (**202**) by hitting a designated function key or key combination, or by clicking on an icon, or by selecting a command from an onscreen menu, or by moving an onscreen cursor to a designated corner of the screen. In response to such user input, the current state of the user interface is saved (**203**), the user interface is temporarily inactivated (**204**), an animation or effect is played or presented to introduce the dashboard (**205**) and the dashboard is displayed with one or more widgets (**206**). If applicable, a previous state of the dashboard is retrieved, so that the dashboard can be displayed in its previous configuration. In some implementations, the user interface and dashboard are active at the same time.

In some implementations, the dashboard is overlaid on an existing desktop user interface (UI). When the dashboard is activated, the existing UI may be faded, darkened, brightened, blurred, distorted, or otherwise altered to emphasize that it is temporarily inactivated. The existing desktop may or may not be visible behind the dashboard. The desktop can also be shrunk to a small portion of the display screen while the dashboard is active, and can be re-activated by clicking on it. In some implementations, the desktop is shrunk and presented as a widget. The desktop can be re-activated by clicking on the widget.

The user interacts with and/or configures widgets as desired (**207**). In some implementations, the user can move widgets around the screen, and can resize widgets if applicable. Some widgets are resizable and some have a fixed size. A widget author can specify whether a widget can be resized. Some widgets automatically resize themselves based on the amount or nature of the data being displayed. Widgets can overlap and or repel one another. For example, if the user attempts to move one widget to a screen position occupied by another widget, one of the widgets is automatically moved out of the way or repelled by the other widget.

The user dismisses the dashboard (**208**) by invoking a dismissal command, which causes the normal UI to return or re-present itself to the display screen. In some implementations, the dashboard is dismissed when the user presses a function key or key combination (which may be the same or different than the key or combination used to activate the dashboard), or clicks on a close box or other icon, or clicks on negative space within the dashboard (e.g., a space between widgets), or moves an onscreen cursor to a predefined corner of the screen.

In some implementations, the dashboard is automatically dismissed (i.e., without user input) after some predetermined period of time or in response to a trigger event. An animation or other effect is played or presented to provide a transition as the dashboard is dismissed (**209**). When the dashboard is dismissed, the current configuration or state of the widgets (e.g., position, size, etc.) is stored, so that it can be retrieved the next time the dashboard is activated. In some implementations, an animation or effect is played or presented when re-introducing the UI. The UI is restored to its previous state (**210**) so that the user can resume interaction with software applications and/or the computer operating system.

In some implementations, the dashboard is configurable. The user can select a number of widgets to be displayed, for example, by dragging the widgets from a configuration bar (or other user interface element) onto the dashboard. The configuration bar can include different types of widgets, and can be categorized and/or hierarchically organized. In some implementations, in response to the user dragging a widget onto the configuration bar, the widget is downloaded from a server and automatically installed (if not previously installed). In some implementations, certain widgets must be purchased, so the user is requested to provide a credit card number or some other form of payment before the widget is installed on the user's machine. In some implementations, widgets are already installed on the user's machine, but are only made visible when they have been dragged from the configuration bar onto the dashboard. The configuration bar is merely an example of one type of UI element for configuring the dashboard. Other configuration mechanisms can be used, such as an icon tray or menu system.

It should be apparent that there are many ways in which dashboards and widgets can be displayed other than those implementations described herein. For example, widgets can be displayed on any user interface or user interface element, including but not limited to desktops, browser or application windows, menu systems, trays, multi-touch sensitive displays and other widgets.

Software Architecture

FIG. **3** is a block diagram of a software architecture **300** for implementing multiple dashboards. The software architecture **300** generally includes a dashboard server **301**, one or more dashboard clients **302**, one or more widgets **303**, and operating system **305**. The server **301** and/or clients **302** use dashboard configuration information **304** to specify configuration options for displaying the widgets **303**, including access levels and the like (if applicable). Such configuration information can include information for two or more dashboards configured by the same user or by different users.

In some implementations, the widgets **303** are displayed using HTML and related web technology. The dashboard server **301** manages and launches the dashboard client **302** processes. Each dashboard client **302** loads a widget **303** (e.g., an HTML webpage) and related resources needed to display the page. In some implementations, the dashboard clients **302** display the widgets **303** without a conventional window frame, menu bar, or other components typically associated with on-screen windows. This technique provides a clean, straightforward display of the overall dashboard to reduce confusion and clutter. The dashboard clients **302** display their respective widgets **303** by rendering web pages into a "WebView," as described in U.S. patent application Ser. No. 11/148,010, entitled "Preview and Installation of User Interface Elements in a Display Environment." The size of each

WebView is defined as metadata associated with the corresponding widget **303**. The server **301** provides data for rendering a separate layer that can be overlaid on the normal desktop of the user interface (hereinafter also referred to as a "dashboard layer"). The widgets **303** are rendered into the separate layer which is drawn on top of the normal desktop, so as to partially or completely obscure the desktop while the dashboard is active.

Dashboard Server

The dashboard server **301** can be a stand-alone process or embedded in another process. The server **301** can be located at the computer **102** or at the remote server **107**. In some implementations, the server **301** provides functionality for one or more processes, including but not limited to: non-widget UI management, window management, widget and dashboard management, fast login, event management, loading widgets, widget arbitration, Core Image integration and widget preference management, as described in U.S. patent application Ser. No. 11/148,010, entitled "Preview and Installation of User Interface Elements in a Display Environment."

Dashboard Client

In some implementations, a dashboard client **302** is a process that uses, for example, objects that are defined as part of a development environment, such as Apple Computer's Cocoa Application Framework (also referred to as the Application Kit, or AppKit) for the Mac OS® operating system. In some implementations, the dashboard clients **302** can be implemented as simplified browser screens that omit conventional interface features such as a menu bar, window frame, and the like.

Widget Format

In one implementation, each widget **303** is implemented as an HTML file. The HTML file can reference other local and remote resources such as style sheets (e.g., Cascading Style Sheets), other HTML files, JavaScript files, images, and the like. Widgets **303** can be implemented using, for example, a flat bundle file format or a packaged HTML file format. In some implementations, the Flat Bundle format includes an info.plist file.

The Info.plist files describes a widget **303** and provides an identifier for a widget **303**. Table I provides an example of Info.plist file contents.

TABLE I

Example of Info.plist File Contents

Key	Type	Description/Value
CFBundleIdentifier	CFString	com.apple.widget <widget name>
CFBundleName	CFString	Name of the widget.
MainHTML	CFString	Name of main HTML resource.
Width	CFNumber	Default width of the widget.
Height	CFNumber	Default height of the widget.
DefaultImage	CFString	Resource name of default PNG file.
Plugin (optional)	CFString	Resource name of native plug-in.
AllowFileAccessOutsideofWidget	Boolean	Access to files across the file system; limited by the users permissions.
AllowFullAccess	Boolean	Access to the file system, Web Kit and standard browser plug-ins, Java applets, network resources, and command-line utilities.
AllowInternetPlugins	Boolean	Access to Web Kit and standard browser plug-ins.
AllowJava	Boolean	Access to Java applets.
AllowNetworkAccess	Boolean	Access to any resources that are not file based.
AllowSystem	Boolean	Access to command-line utilities using widget script object.

The keys AllowFileAccessOutsideofWidget, AllowFullAccess AllowInternetPlugins, AllowJava, AllowNetworkAccess, and AllowSystem are Boolean types that can be set by a widget author to enable certain levels of resource access.

Dashboard Invocation

FIG. **4***a* depicts a desktop user interface **400** prior to activation of a dashboard. The desktop user interface **400** (also referred to herein as "desktop") is a conventional user interface as may be provided by an operating system, such as Mac OS®. The desktop **400** has a background image, menu bar **401**, and other standard features. As is known in the art, the desktop **400** may also include windows, icons, and other elements (not shown). The user activates the dashboard by selecting an item from a menu, or by clicking on an icon, or by pressing a function key or key combination, or by some other means for invoking activation.

FIG. **4***b* depicts an initial state for a dashboard layer **402**. In some implementations, a configuration bar icon **403** is initially displayed. Alternatively, upon activation the dashboard layer **402** can display one or more default widgets **405**, **407**. If the dashboard layer **402** has previously been activated and configured, the widgets **405**, **407**, can be displayed as previously configured. As shown in FIG. **4***b*, the dashboard layer **402** is not necessarily visible as a distinct layer. However, its various components (such as widgets, icons, and other features) are visible. In some implementations, these components are displayed in a transparent layer, thus maintaining the visibility of the desktop **400** to the user. In some implementations, the desktop **400** and its components are darkened (or blurred, or otherwise visually modified) while the dashboard layer **402** is active, so as to emphasize that the desktop **400** is temporarily inactive. In other implementations, the desktop **400** is not visible while the dashboard layer **402** is active. The user can reactivate the desktop **400** and dismiss the dashboard layer **402** by clicking on an area of the screen where no dashboard element is displayed (i.e., "negative

space"). In some implementations, other commands, key combinations, icons, or other user input can be used to dismiss the dashboard layer **402**.

In some implementations, the user can drag the icon **403** to any location on the screen, and the position of the icon **403** will remain persistent from one invocation of the dashboard layer **402** to the next. The user can click on the icon **403** to activate the configuration bar **408**, as shown in FIG. **4***c*. The configuration bar **408** provides access to various widgets that can be placed on the dashboard. In some implementations, a text label is shown for each available widget (e.g., calculator, stocks, iTunes®, etc.). In some implementations, an icon is shown for each available widget (e.g., calculator icon **410**). If many widgets are available, the widgets may be arranged hierarchically by type (e.g., game widgets, utility widgets, etc.), or alphabetically, or by any other categorization methodology. For example, a number of categories may be displayed, and clicking on one of the categories causes a pull-down menu to be displayed, listing a number of widgets in that category. In some implementations, a buy widget **406** is also available, allowing the user to select widgets from an online store or website.

Note that the particular configuration and appearance of configuration bar **408** in FIG. **4***c* is merely exemplary, and that many other arrangements are possible. For example, widgets can be installed from other locations, other applications or other environments, without requiring that they first be part of the configuration bar **408**. The user can dismiss the configuration bar **408** by clicking on dismissal button or icon **404**.

Alternative Implementation of Configuration Bar

FIGS. **4***g*-**4***i* illustrate an alternative implementation for deleting a widget from a configuration bar **416**. For example, when a user moves a cursor onto the "calculator" label (e.g., a mouse-over) associated with a calculator widget **418**, the label is highlighted or otherwise altered, and a delete mechanism (e.g., a delete button) is displayed. If the user clicks or otherwise invokes the delete mechanism, a confirmation overlay **420** is displayed asking the user to confirm the removal and/or deletion of the "calculator" widget. In some implementations, the confirmation overlay **420** is semi-translucent. If the user requests deletion (e.g., clicking the "yes" button), then the calculator widget **418** is removed from the configuration bar **416**, as shown in FIG. **4***i*.

Installation of Elements

Elements, including user interface elements such as widgets can be installed in a display environment as discussed below. One display environment, a dashboard, will be used for illustrative purposes. Installation can include a preview operation as is discussed below. Installation can include selection of the element, such as by a drag and drop action. Other selection means can be used. In one example, a user can drag widgets from configuration bar **408** onto the surface of the dashboard (in other words, anywhere on the screen), using standard drag-and-drop functionality for moving objects on a screen.

FIG. **4***d* depicts the selection of the calculator widget icon **410** from the configuration bar **408**. The calculator icon **410** which is associated with a calculator widget **409** is highlighted, or otherwise augmented or embellished, to indicate that it has been selected by a user with cursor **411**.

In some implementations, widgets in the configuration bar **408** are smaller than their actual size when installed. When the user clicks on a widget and begins to drag it into a dashboard or other display environment, the widget is animated to its actual or installed size to assist the user in the real-time layout of the dashboard. By animating the widget to its actual size, the user will know the actual size of the widget prior to its installation.

In some implementations, an animation, such as a ripple animation, is shown when the user "drops" a widget by releasing a mouse button (or equivalent input device) to place a widget at the desired location. In one implementation, the dragging of the widget to the dashboard layer **402** invokes an installation process for installing the widget including previewing. After installation, the user can move a widget, to any other desired location, or can remove the widget from the screen, for example by dragging it off the screen, or dragging it back onto the configuration bar **408**, by invoking a remove command, disabling a widget in a menu associated with a widget manager or canceling the installation during the preview, as described with respect to FIGS. **5**, **6** and **7**. In some implementations, the position, state, and configuration of a widget are preserved when the dashboard layer **402** is dismissed, so that these characteristics are restored the next time the dashboard layer **402** is activated.

In some implementations, widgets and/or dashboard layers (including widgets) can be installed from within a running application. For example, a widget and/or dashboard (including widgets) can be an attachment to an email. When the user clicks the attachment, an installation process is invoked for the widget and/or dashboard which can also include a preview.

Widgets can be created or instantiated using an installer process. The installer process can include a separate user interface or an integrated user interface (e.g., integrated in the display environment or separate from the display environment, for example, in another display environment associated with another application, such as an email application) for selecting and installing widgets in a display environment. For example, a widget received as an email attachment can be launched by a user from directly within a user interface of the email application.

Widgets can be created or instantiated using an installer process. The installer process can include a separate user interface or an integrated user interface (e.g., integrated in the display environment or separate from the display environment for example in another display environment associated with another application, such as an email application) for selecting and installing widgets in a display environment. Thus, the installation area for the widget can be embedded within an application display area or window. For example, if a user receives a widget as an attachment to an email, the user can invoke and install the widget from within the email message window without the need for a separate installation window.

In general, an installer process is used to provide additional functionality to the creation/instantiation process, beyond the simple drag and drop operation describe above. Additional functionality can include preview, security and deletion functionality in a singular interface. The installer process can be a separate process or combined in another process. The installer process can itself be a separate application that is executable to install widgets (or other elements) in a display environment. As used herein, the term "process" refers to a combination of functions that can be implemented in hardware, software, firmware or the like.

Installer Process Engines

FIG. **5** is a block diagram of an installer process **500** for installing widgets in a display environment, including a selec-

tion engine **543**, a security engine **544**, a preview engine **545**, a theme engine **546**, an installation engine **547**, and a deletion engine **549**.

Selection Engine

The selection engine **543** is used to select and present (e.g., a static presentation) a widget for installation. The selection engine **543** can be invoked in a display environment and can produce an installation area (e.g., a dialog, a panel, a window, etc., and hereinafter referred to as an "installation window"), that acknowledges the user's initiation of the installer process. The installation window can include a presentation of a selected widget (or a reference thereto as described below), along with various buttons that may be activated by the user or otherwise to invoke functionality in the installer process.

A screen shot showing an installation window **450** in a user interface is shown in FIG. **4***e*. Installation window **450** can include one or more interactive features (e.g., buttons) that allow a user to install (e.g., install button **452**), or cancel the operation (e.g., cancel button **454**). In some implementations, preview is automatic. Alternatively, preview can be selected for enablement prior to installation. Installation window **450** can include a reference **456** and a prompt **458**, as described below.

In some implementations, the installation window **450** is invoked by clicking on a widget file or package. For example, a weather widget file **413** (e.g., "weather.wdgt") can be downloaded to the desktop **400** from a web site. When the user double clicks the "weather.wdgt" file with cursor **411**, the installation window **450** is displayed in the dashboard layer **402**, as shown in FIG. **4***e*.

In some implementations, a user can select a widget for installation using a remote control device (e.g., infrared device, mobile phone, etc.). For example, a dashboard and/or widgets can be displayed on a display device (e.g., television screen, computer monitor, etc.). The user can use the remote control to select widgets from a menu or configuration bar **408** for installation. The widgets can be displayed in one of multiple resolutions, which is selectable by the user via the remote control. For example, a user can select a widget to be scaled to fit a desired portion of the display device (e.g., full screen).

Security Engine

The security engine **544** is used to determine a security access level (or risk level, or both) for either the user or the element to be installed. Security engine **544** can be used to limit the ability of the user to install particular kinds of elements (e.g., based on categories or criteria). In addition or alternatively, security engine **544** is used to determine a security access level (or risk level or both) of an element to be installed. Based on the security access/risk level, one or more operational or functional constraints can be placed on the element during the preview process. For example, limitations on the ability of the previewed element to interact, access, read or write data, monitor output of other system resources, access other system resources, or other limitations can be invoked. The invocation can be temporary, for a predetermined time period, or until the preview has terminated and complete (non-limited) installation has been performed. Functionality or operations of the element can be enabled or disabled, depending on the access level. The security engine **544** can use metadata associated with the element to be installed, user input, contextual information, file type information, default data, read/write preferences, cookies and/or other information to determine the access/risk level. Access control lists including white lists (e.g., including lists identifying certified or otherwise safe elements), black lists (e.g., including lists identifying un-certified or otherwise un-safe elements) and the like can be used to determine the access/risk level.

In some implementations, widgets are rated according to their content (e.g., adult content, violence, strong language, etc.). The rating can be determined by the author a third party rating organization. The rating can be used to determine whether a widget will be installed and/or previewed. In some implementations, users can specify which widgets can be installed and/or previewed based on ratings. For example, a parent may specify via a preference pane or other input mechanism that widgets containing adult content ratings will not be installed nor previewed (i.e., parental controls).

In some implementations, widgets are digitally signed by their authors. Digital signatures can be incorporated in files bundled with the widget and can be generated using one or more known digital signature techniques (e.g., key exchange, hashing, message digest, etc.). The digital signature can also be authenticated using a digital certificate issued by a certificate authority using techniques known in the art.

Various techniques for widget security is described in U.S. Provisional Patent Application No. 60/730,956, entitled "Widget Security."

Preview Engine

The preview engine **545** is used to preview (e.g., dynamically) an element (e.g., a widget) that has been selected to be installed. Referring again to FIG. **4***f*, the preview engine **545**, when invoked, provides an area (hereinafter "a presentation area or presentation window **462**" or specifically a "widget window" when used to display a widget) into which the selected element can be displayed. In some implementations, the presentation window **462** is a separate process and embedded within an underlying installer window (i.e., the installation window **460**) which, in one implementation, is itself a separate process. In one implementation, the preview engine **545** provides a presentation of a fully functional element/widget in the presentation window **462**. The term "fully functional" refers to both the presentation of the widget in terms of size, shape, content and the like along with any supported interactivity features. Alternatively, limitations on the functionality, interactions and the like can be set by the security engine **544** as discussed above. Interactivity can include the separate refreshing of content in the presentation window **462**. Alternatively, the content can be static, and only present ornamental properties.

Associated with the preview is a preview designator **464**. In one implementation, the preview designator **464** is displayed along with the user interface element being installed (e.g., widget). The preview designator **464** can be of the form of a frame, a carpet on which the presentation window **462** is disposed, a preview theme element, or other designator that overlays, surrounds, bounds or otherwise is associated with the presentation window **462**. The preview designator **464** can be a separate process and embedded within an underlying installer window (e.g., the installation window **460**) or the presentation window **462** which, in one implementation, may themselves be a separate process. The preview designator **464** is provided to indicate to a user that the element is being previewed and, as of yet, has not been fully installed in the display environment. Further emphasis can be used to convey this information including by using highlights, emphasis, de-emphasis, effects, transitions and the like. The combina-

tion of the presentation window **462** and the preview designator **464** comprise an installation area for the user interface element to be installed. The installation area can be part of the display environment in to which the element is to be installed (e.g., part of the dashboard) or part of a separate display environment (e.g., part of another user interface, another user interface element, another application, or process, etc.).

When displaying a fully interactive widget in the presentation window **462**, user input can be accepted that can result in changes in the presentation. For example, if the widget includes a URL that may be linked to, interaction can include the generation of an underlying page request and the presentation of the requested page in the presentation window **462**. Interaction with user interface elements is described in U.S. patent application Ser. No. 11/145,561, for "Application Clipper." If the interaction is not allowed, a display prompt can be shown to indicate that the operation or function is temporarily disabled during the preview operation.

Window Manager

In some implementations, a window manager **550** is associated with the preview engine **545**. The window manager **550** can be a separate process that is used to support the interaction between the presentation window **462**, preview designator **464** and the installation window **460** described above. In some implementations, the logic associated with the window manager **550** can be implemented in a same or separate process from the installer process or the preview process. In some implementations, the window manager **550** controls the interaction of the respective windows. Specifically, three separate interactions can be controlled.

First, in some implementations, each window is a separate process displayed and brought forward (in a window hierarchy) together. The bringing together of the multiple distinct windows, each associated with separate processes can be controlled by the window manager **550**.

Second, in some implementations, the presentation window **462**, preview designator **464** and the installation window **460** are required to interact with each other in predefined ways. For example, the presentation window **462**, preview designator **464** and the installation window **460** need not only to be brought forward together, they must also be controlled when interactions are required for the windows once displayed. For example, if one window is moved, i.e., using a drag and drop operation, the multiple windows are managed so that the presentation remains unified (i.e., the presentation window **462** and preview **464** designator are maintained within the installation window **460**, though the installation window **460** was the process that received the user interaction to move). To accomplish such, window manager **550** provides an interface between the windows to allow for the receipt of input in one process and the translation to the other process.

Third, in some implementations the windows must be maintained within operating constraints of each underlying process. For example, when one window is resized (i.e., the installation window **460** is resized), the window manager **550** controls the relative presentation of the other windows (continuing this example, when the installation window **460** is resized, the presentation window **462** and preview designator **464** may be repositioned to be centrally displayed in the installation window **460**). Note, this third level of management includes management of process constraints. Process constraints include limitations on the changes that can be performed within the context of the installer process for any of the windows. For example, a minimum size constraint can be associated with the underlying presentation window **462**, such that resizing of the associated installation window **460** can be constrained to not be so small as to be unable to present the minimum sized presentation window **462** in the newly downsized installation window **460**.

The preview engine **545** is responsive to an initiation signal/action and provides the display of the selected widget in a presentation window **462** as described above (see FIG. **41**). Associated with the presentation window **462** can be one or more input mechanisms (e.g., buttons) that allow a user to continue in the installation process (e.g., a keep or install button **465**), or cancel the installation process (e.g., delete button **467**). In some implementations, if the installation process is cancelled, the presentation process terminates and returns control to the prior operative environment (i.e., return to the initiating point, for example, reinitiating the selection process).

In some implementations, the installer process does not include or allow for the selective bypassing of the preview presentation (e.g., bypass preview or does not include the preview engine **545**). In some implementations, the preview engine **545** is itself a separate process or application (e.g., can be separate from the installer process **541**). In some implementations, the preview engine **545** is itself a user interface element (e.g., a preview widget) that can be used to preview widgets prior to installation, deployment, instantiation, or the like.

Theme Engine

Theme engine **546** is operative to provide additional content to accompany the content displayed in the presentation window or installation window. The theme engine **546** is operative to determine a theme to be associated with an item to be installed (e.g., a widget), identify additional content for concurrent display, and facilitate the display of the additional content. Additional content can be of the form of a frame that is used to bound the item to be installed on one or more sides. Examples of additional content include a picture frame, a content player (e.g., a video player, a still image player, etc.). The additional content can be static or include functional elements (e.g., buttons, for example to play content). Alternatively, the additional content can be displayed in an overlay or other overlapping manner, be a separate process or window or be part of the presentation window. The additional content can be stored or retrieved as required. The identification of the additional content by the theme engine **546** can be based on meta-data that accompanies the item to be installed, based on an analysis of the item to be installed, automatically defined based on file type (e.g., all .pic files are provided a picture frame, or all preview files are provided with a preview frame). Themes can be assigned by a user after receipt or prior to transfer to a receiving party.

Installation Engine

The installation engine **547** is operative to install/instantiate the selected widget in the display environment. The installation engine **547** can copy or move as required the selected widget to an appropriate volume and store the data structures (including preference data, identification data, scripts, navigation data and the like) for use in the display environment. In some implementations, the installation engine **547** includes an automatic invocation of the underlying display environment with the installed user interface element presented (i.e., the installation engine **547** installs the widget in, and opens up, a dashboard including the installed widget in a preview

mode). In some implementations, the installation engine **547** include a management engine **548**.

Deletion Engine

The deletion engine **549** provides control for widgets after installation. The deletion engine **549** can be a separate process from the installer process **541**, or included therein. The deletion engine **549** can receive input and display user interface elements (dialogs and the like) to ensure that deletion operations are effectuated as required. The deletion engine **549** can be responsive to the selection of a user interface element, a portion of the element, controls associated with the element and the like.

In some implementations, the deletion engine **549** receives mouse over input and displays a graphical element associated with a given identified element. The graphical element can include a control that allows for the activation of the deletion engine. The activation can cause the display of a window (e.g., a confirmation window) to ensure appropriate behavior. Other methods for deleting user interface elements are possible. For example, deletion of a user interface element can also be effectuated during the installation process as discussed above. More specifically, a user interface element can be previewed using the preview engine **545**, and subsequently deleted prior to full installation.

Deletion can include deactivating a user interface element and leaving its associated files on the host system or device, or deleting the user interface element and removing all its associated files from the host system or device. The user can be prompted to confirm deletion of a user interface element before deletion is initiated.

In some implementations, the installer process **541** is part of a separate process that is not associated with a dashboard layer. Alternatively, the installer process **541** can be part of a dashboard application and be activated, by for example, by selecting a widget for addition to the dashboard layer. Selection can include for example double clicking on a widget displayed in a configuration bar **408** (shown in FIG. **4***c*). Other installation tools are possible. For example, a widget bar (not shown) can be used to display the widgets that are available for installation in a given display environment. The widget bar can be part of an authoring application for the creation of widgets, or be selectively activated. Alternatively, the installer process **541** can be separately called, with the destination of the widget being defined as part of the application (e.g., into a dashboard environment, a desktop environment, an electronic display device environment, or the like).

Dashboard Environment

In a dashboard environment, installer process **541** can include a widget bar and an associated installer process. The installer process when invoked can cause the display of the widget bar in the user interface. In one implementation, the dashboard layer itself, as currently configured can also be displayed when the installer process is invoked. The installer process can then be invoked to select available widgets for installation from the widget bar, preview widgets, or remove installed widgets (e.g., remove widgets from the widget bar) depending on the configuration of the installer process.

Desktop Environment

In a desktop environment, installer process **541** can be of the form of an installer application that can be invoked (automatically, by the user, by the operating system, by an application or other invocation tool) to present user interface elements that are available to be installed in the desktop environment. The installer application can include a user interface element bar and an associated installer process. The installer process when invoked can cause the display of the user interface element bar in the user interface. The installer process can then be invoked to select available user interface elements for installation from the user interface elements bar, preview user interface elements, or remove installed user interface elements (i.e., remove user interface elements from the user interface elements bar) depending on the configuration of the installer process.

Installation Process

FIG. **6** is a flow diagram of a process for installing a user interface element (e.g., a widget) in a display environment. The process includes identifying a user interface element (**602**). Identifying the user interface element can include locating a widget. Locating can include using a search tool or the like to locate widgets available for installation. Alternatively, other methods can be used for identifying user interface elements for installation including automatic and user controlled identification methods.

After identification, the identified user interface element is selected for installation (**604**). Selecting a user interface element can include selecting a user interface element from a configuration bar (e.g., configuration bar **408**), a widget bar, a tool bar, a menu, an authoring application, or other source. Alternatively, selecting can include dragging or dropping the user interface element onto a display environment (e.g., a dashboard layer), downloading the user interface element from a content source or other source, or other selection process. Selecting can include launching an associated installation process for installing the user interface element, a preview application for previewing the user interface element prior to installation or other application including authoring applications. The launching of the applications can be automatic or user or otherwise selectively controlled.

Upon receipt of the selection, an installation window is presented (e.g., installation window **460**). In some implementations, the installation window includes a user interface display portion, a prompt, and one or more interactivity elements. The user interface display portion can include a reference, partial display, or complete (e.g., complete but for the ability to interact, a static display) display of the user interface element that has been selected. The reference (e.g., reference **456**) can be a complete reference, a pointer, a designator, a still image, or otherwise that identifies the candidate user interface element for installation. In this way, the user is able to recognize that the selection made corresponds to content (e.g., a widget) that the user desires to install.

The prompt can be of the form of a confirmation to the user of the underlying action (e.g., prompt **458**). In one implementation the prompt can be used to confirm a desire to install a named widget. In other implementations, the prompt can be used to confirm not only the named user interface element for installation, but the display environment into which the user interface element will be installed (e.g., "Install named widget #**1** on my desktop?" or "Install widget #**1** on dashboard #**1** of 2?"). In still other implementations, the prompt can include a confirmation of an action (e.g., "install the widget and open it in my dashboard").

The interactivity elements can be of the form of buttons or the like. In one implementation, the installation window includes two interactivity elements including a cancel ele-

ment (e.g., a cancel button **454**), and an installation element (e.g., an installation button **452**). Other interactivity elements are possible, including those that link to other associated applications, content sources (e.g., to allow for the selection of a different widget for installation), preview option (e.g., if not automatically previewed) and the like.

Continuing with the method, if a preview option is selected or required (optional), then a preview of the widget in a preview environment is created and presented (**606**). The creation of the preview environment can include the invocation of a window management engine (e.g., window manager **550**) for managing the interaction of one or more windows that make up the preview. In some implementations, the preview includes a presentation window (e.g., presentation window **462**) and a preview designator (e.g., preview designator **464**) that are separate processes. The presentation window is used to display an instantiation of the selected widget. In some implementations, the display of the presentation window includes an instantiation of the selected widget in a selectable interactive environment. The preview designator is provided to clearly indicate that the preview operation is being performed, as opposed to a conventional direct installation. In some implementations, the preview is presented at a same location in the user interface. Alternatively, if other elements are present at this location, another location or an temporary overlay can be used. In some implementations, the preview designator **464** is a carpet, onto which the presentation window **462** is laid (e.g., layered, overlaid, or the like).

In some implementations, theme content can be presented along with the user interface element in the preview installation window **460**. The theme content can include a theme presentation element that operates as the preview designator (e.g., additional content that is recognized as being part of a preview of an item, for example a preview Title or the like). Other theme content can be presented to preview how the final installed version of the user interface element will appear. For example, assuming a theme border is to be presented with the user interface element at installation, the preview can include the same theme border.

Associated with the preview process may be an authoring or selection process. For example, if the preview displayed is not satisfactory to a user (e.g., the theme content is unsatisfactory), an interactivity element can be presented in the user interface to allow the direct launching of another process (e.g., a search process or application, an authoring application, a selection application or other process or application so that a more appropriate/desirable user interface element can be located/installed) with or without terminating the installation process.

Finally, the user interface element can be installed (**608**). The installation of the user interface element can include the installation on a tool bar (e.g., a widget bar), in a resource, in a widget manager or in a display environment (e.g., directly on a dashboard layer or the desktop). Installation can include the saving of the underlying content metadata including data structures defining the user interface element in a library or the like. Alternatively, the installation can be part of an underlying application (e.g., directly in an associated dashboard application or a library associated therewith). In some implementations, the installation of the user interface element includes the removal of the preview designator. For example, where a carpet is used to designate the preview, the carpet can be removed for the final installation. In one implementation, the final installation is performed at a same location in the user interface as the preview. In some implementations, an animation or other transition effect can be used when moving from preview to final installed user interface elements. Transitions can include the appearance of pulling of the a carpet preview designator from under the user interface element or otherwise making the carpet disappear.

The process steps described can be performed in other orders, repeated or the like to provide desired results. For example, the preview process can be repeated in association with the selection of multiple different user interface elements prior to invoking the installation step.

Once installed, user interface elements can be removed/deleted from the display environment as required. In some implementations, a separate deletion process is provided from the installation process. Alternatively, the installer process can be invoked to remove/delete user interface elements as required.

In some implementations, deletion includes deactivating the widget but the widget remains installed on the system or device. Alternatively, deletion includes removing the widget completely from the system or device. If a request to delete a widget is received in response to a user action (or programmatically by the operating system or another application), then a message providing the user with deletion options can be presented, enabling the user to determine whether the widget will be deactivated and/or removed from the system or device. In some implementations, the system or device executes a default deletion option which can be changed by the user via a preference pane or other input mechanism, or overwritten by an application or other software component or device (e.g., security engine **544**).

Widget Searching

In some implementations, widgets are associated with a widget data type or other metadata to enable a search engine (e.g., Apple's Spotlight® search engine) to search for widgets in files, documents, images, emails, applications, etc. Widgets can be indexed based on data type and/or other metadata. For example, a query can be generated requesting a list of all widgets on a host machine and/or devices on a network. The search engine accesses the index to locate widgets on the host device and/or network devices.

In some implementations, dashboards can be searched by other dashboards and/or a search mechanism (e.g., a search engine) for particular widgets or for other dashboards. For example, a query can be generated programmatically or by user requesting a list of all widgets and/or dashboards related to a particular user interest which are available for access locally or through a network connection.

Widget Manager

In some implementations, a widget manager allows users to inspect, remove, enable, disable, show and hide widgets. The widget manager can be a preference pane, a standalone application or a plug-in. The widget manager displays widget information, including but not limited to the widget's title, author, version, class, type, ratings, description, etc. The information can be displayed in any order and format according to one or more sorting criteria, such as alphabetical or chronological order, author, class, rating, etc. In some implementations, the widget manager tracks widget updates and automatically notifies the user or host system or device when an update is available.

In some implementations, the widget manager allows users to perform certain actions on widgets, including but not limited to copying, moving, deleting, uninstalling, deactivating, enabling, disabling, renaming, previewing, showing, hiding etc. In some implementations, the widget manager includes

functionality that allows the import and export of widgets to and from various widget sources (e.g., network, email, CD ROM, etc.). For example, widgets can be imported and exported to and from a web site that can be accessed by multiple users. In some implementations, the widget manager includes a search field that allows users to search for widgets on a host system or device, and/or one or more networked devices.

In some implementations, the widget manager can be invoked by a button or other input mechanism located in a user interface (e.g., desktop, system tray, dashboard layer, configuration bar, etc.). For example, when the button is activated, the widget manager is launched and a user interface is displayed. In some implementations, the widget manager is a widget itself and includes at least some characteristics, attributes or properties of other widgets. For example, the widget manager can be enabled or disabled, resized, hidden, dragged and dropped, flipped to reveal special options or preferences, etc.

In some implementations, the widget manager can be displayed in a format that is consistent with a dashboard theme or content. The appearance and/or properties of the widget (e.g., colors, styles, fonts, etc.) can be changed by a user via a preference pane or other input mechanism.

Example User Interface for a Widget Manager

FIG. **7***a* illustrates a user interface **702** for a widget manager. It should be apparent that a user interface for a widget manager can include more or fewer features than shown.

In some implementations, the user interface **702** is displayed in another user interface **700** (e.g., a desktop or dashboard layer) in response to user input. User input can include, for example, clicking on a button **716** (e.g., a "Manage Widgets" button) or other input mechanism located in the user interface **700**. The user interface **702** can be dismissed by clicking on button **722** or other input mechanism.

In some implementations, the user interface **702** includes a scrollable list **706** of widget names and/or other attributes which correspond to widgets that have been installed on the host system. In some implementations, the scrollable list **706** includes widgets that reside on the host system but have not been installed (e.g., widgets downloaded to a desktop). This implementation enables users to install widgets from within the widget manager. In some implementations, the list **706** includes names of widgets that reside on another device coupled to the host system via a network connection. In some implementations, a search history is maintained to enable the user to refine search terms and/or re-run a previous search.

Optionally, next to each widget is an icon image **710** associated with the widget that can assist the user in selecting the widget from the list **706**. Widgets that are selected to be hidden (e.g., based on a "hide widget" option provided in the widget manager) will not be shown in the list.

The widgets can be scrolled using, for example, a scroll bar **712**. Users can also toggle each widget on and off (i.e., enable/disable the widget) by selecting a checkbox **708** located to the left of each widget listing. Similarly, on the right side of some widget listings is a button **707** or other input mechanism that allows users to delete the widget. Note that for this example, widgets that cannot be deleted do not have a corresponding button **707**.

In some implementations, the user interface **702** includes a menu **704** (e.g., located at the top of the user interface **702**) of sorting options that will sort the widget list **706** by name, date, author, rating or any other sorting criteria. In some implementations, the menu **704** includes an option to sort widgets based on whether the widgets are enabled or disabled.

In some implementations, a button **714** (e.g., a button labeled "More Widgets . . . ") or other input mechanism allows a user to search for more widgets located in local directories or on one or more network devices (e.g., a website).

In some implementations, when a widget is enabled (check box **708** is checked) the widget's icon image **720** is displayed in a configuration bar **718** in user interface **700**. For example, since the check box **708** associated with the "weather widget" is checked, its icon image **720** is displayed in the configuration bar **718** in user interface **700**. Similarly, if the check box **708** is unchecked, then the image icon **720** is not displayed in the configuration bar **718** or its appearance is altered (e.g., grayed out, darkened, made translucent, etc.) to indicate to a user that the widget is disabled.

FIG. **7***b* illustrates a widget manager overlay **730** for requesting a user to confirm the deletion of a widget. In some implementations, when clicking the delete button **707** (FIG. **7***a*), a semi-translucent overlay **730** appears within the user interface **702** including a message **728** requesting the user to confirm their intent to delete the widget. For example, the message **728** could be "Move this widget to the Trash?" The user can respond to the message **728** by clicking a button **726** ("OK"), which results in the widget being moved to the "Trash" or otherwise deleted from the host system. The user can also respond by clicking a button **724** ("Cancel"), which results in the deletion operation being terminated. If a widget is moved to the "Trash" or otherwise deleted, then its icon image **720** is removed from the configuration bar **718**.

Multiple Dashboards

FIG. **8** illustrates a user interface **800** displaying dashboard environments **802** and **804**. In some implementations, more than one dashboard is available. For example, the user can create and configure one dashboard to contain widgets related to work, and another for widgets related to personal matters. Different trigger events (e.g., different key combinations, menu selection, etc.) can be used for triggering the dashboards. State information for each dashboard can be saved enabling the dashboards to be restored to their previous respective configurations. Different dashboards can contain one or more of the same widgets. State information for a widget can be maintained separately for each dashboard in which the widget appears, or it can be commonly maintained across all dashboards in which the widget appears. Different dashboards can be available or "owned" for different users of a computer or other electronic device, such that each user can only access their own dashboard(s). A user can specify a dashboard as being available to other users, if desired. A user can also specify, for any or all of the dashboards he or she creates, whether other users are permitted to make changes to the dashboard(s).

In some implementations, the dashboard environments **802**, **804**, are associated with display areas **806**, **808** which are controlled using one or more control elements **810** and navigated using one or more navigation elements **812**. The display areas **806**, **808**, can be configured to be displayed on multiple display devices (e.g., two different monitors). Display areas **806**, **808**, can be generated by a network device (e.g., a web page server) and transmitted over a network connection (e.g., the Internet) for presentation on a user device (e.g., embedded in web pages).

Although FIG. **8** shows two dashboard environments and their associated display areas, more than two dashboard envi-

ronments and their associated display areas can be created, invoked and/or presented as desired, depending on the needs of a user, application, operating system, etc.

In some implementations, the display areas **806**, **808**, can be presented and arranged in the user interface **800** in either an ad hoc manner (e.g., anywhere in the user interface) or an orderly manner (e.g., cascaded, tiled, etc.). For example, in FIG. **8** the display areas **806**, **808**, are tiled (side-by-side) in the user interface **800**. In some implementations, display areas **806**, **808**, can be presented in the user interface **800** at different locations and at different times. For example, when the display area **806** is active in the user interface **800**, the display area **808** can be hidden or obfuscated (e.g., darkened, faded out, etc.). In such an implementation, each of the display areas **806**, **808**, can be a dashboard layer **402**, as described with respect FIG. **4**. A user can transition between display areas **806**, **808**, using one of a number of known transition effects, including but not limited to carousels, panning out, flips, peeling, slide in/out, confetti, etc. A transition between display areas **806**, **808**, can be initiated through physical input devices (e.g., keyboard, mouse, etc.) and/or virtual input devices (e.g., buttons, sliders, etc.). In some implementations, a transition from a first display area to a second display area occurs without closing or hiding the first display area.

Generally, dashboard environments can be invoked (with their associated display areas presented in a user interface) in response to user input (e.g., key combinations, mouse clicks, touch input, etc.), inferred by context or programmatically by an application, operating system, etc. Display areas can be resized and dragged about the user interface as desired.

The control mechanisms **810** (e.g., buttons) are used to close, minimize and restore (up/down) the display areas **806**, **808**. The navigation mechanisms **812** (e.g., scroll bar, arrows, etc.) are used to navigate the dashboard environments **802**, **804**. For example, by sliding a scroll bar **812**, the user can display hidden widgets in the dashboard environment **804** in the display area **808**. Thus, the dashboard environments **802**, **804**, can be larger than their corresponding display areas **806**, **808**.

In some implementations, the dashboard environment **802** includes one or more widgets **814** and the dashboard environment **804** includes one or more widgets **816**. The widgets **814** and **816** can be in the same widget class (e.g., all game widgets), different widget classes (e.g., game widgets, utility widgets, etc.), or partially overlapping two or more classes. In some implementations, the widgets **814** and **818** can communicate information or data to each other across dashboard environments. For example, a widget **814** in the dashboard environment **802** can generate data that is processed, displayed and/or printed by a widget **816** in the dashboard environment **804**, and vice-versa. A widget can also be in both dashboard environments **802**, **804**.

In some implementations, widgets can be installed/instantiated in multiple dashboard environments using a multiple dashboard installation process **900**, as described with respect to FIG. **9**. In other implementations, widgets can be installed in a dashboard environment by dragging a widget from another location in the user interface **800** (e.g., from a configuration bar or desktop) and dropping it into the display area associated with the dashboard environment where the widget is to be installed (i.e., drag and drop functionality). Widgets can be dragged from any user interface, including but not limited to: a desktop, an application, a display window for another dashboard environment, etc. In some implementations, packages of widgets are installed in a dashboard environment.

In some implementations, a dashboard environment and widget can be matched up based on a widget class or a theme, as described with respect to FIG. **5**. Widgets can also be previewed prior to installation in a dashboard environment, as described with respect to FIG. **6**. The preview can occur in a dashboard display area or in a separate preview window in a user interface.

As previously discussed with respect to FIGS. **4**, **5** and **6**, a configuration bar **408** can be used to store images of widget icons which can be clicked or dragged into a display area for a dashboard environment to trigger invocation of the widget. During dragging, the widget can be animated to its actual size to assist the user in real-time layout of widgets in the dashboard. In some implementations, a widget manager is used to preview, install, enable, disable, show and hide widgets, as described with respect to FIGS. **7***a* and **7***b*. For example, the widget manager can include an button or other input mechanism which when activated invokes a preview of the widget. The user can be provided with an option to install or delete the widget during or after the preview.

Multiple Dashboard Installation Process

FIG. **9** is a flow diagram of a process **900** for installing widgets in multiple dashboard environments. The process **900** begins by identifying a widget for installation in a dashboard environment (**902**). A widget can be identified for installation when a request to install is received (e.g., from user input or programmatically) or an attempt to install is detected. For example, when a user downloads, copies or transfers a widget, or a package of widgets, from an external source (e.g., a web site, CD ROM, email attachment, etc.) onto their computer or other electronic device (e.g., mobile phone, media player, etc.), each widget is identified for installation into one or more dashboard environments. Once the widget is identified for installation, one or more suitable dashboard environments are selected for the widget based on one or more selection criteria (**904**). The widget is then installed/instantiated in the selected dashboard environment(s) (**906**).

In some implementations, dashboard icons can be displayed in a configuration bar in the same manner as widgets. Similar to a widget, a new dashboard can be installed or launched by clicking on the dashboard or an icon associated with the dashboard, or dragging the icon from the configuration bar and dropping it into the display area of another dashboard or a user interface.

In some implementations, a dashboard of dashboards can be created for enabling the user to select between multiple dashboards. A dashboard of dashboards can be have an icon which is displayed in a configuration bar. When the user clicks on the icon, or drags and drops the icon in a display area, the dashboard of dashboards is displayed. A dashboard of dashboards can have all the properties and characteristics of the other dashboards described herein.

In some implementations, the selection criteria can be based on a theme, as described with respect to FIG. **5**. For example, a widget that is associated with a theme can be matched up with a dashboard environment associated with the same or similar theme during installation.

Another selection criteria can be a widget's class. A widget can be installed in a particular dashboard environment based on its class. For example, a widget that is classified as a game widget can be installed in a dashboard environment for game widgets. Such an environment can include, for example, widgets having large game controls (e.g., joysticks), programmable buttons, etc.

Similarly, widgets that are associated with digital media items can be installed in a dashboard environment for digital media items (e.g., media players, etc.). In such an environment, the display window associated with the dashboard environment may be invoked in a full screen mode based on the presumption that a medium item (e.g., a video) will be played.

In some implementations, the widgets are matched to suitable dashboard environments based on information contained in one or more files or data bundled with a widget (e.g., an info.plist file). For example, widgets that are requesting access to system or network resources can be matched to a dashboard environment that is associated with certain security rules or that includes security event monitoring, such as the security monitoring described in co-pending U.S. Provisional Patent Application No. 60/730,956, entitled "Widget Security."

The display area for a dashboard environment can be customized based on its theme or class by specifying various attributes or properties of the display area, such as fonts, styles, colors, type and number of control and navigation mechanisms, viewing angles (e.g., full screen, half screen, etc.) and the like. In some implementations, widgets installed in a customized display window inherit the same attributes or properties as the display area to maintain a uniform appearance between the display area and the widgets (i.e., to maintain the "look and feel").

In some scenarios, preexisting dashboards may not be available for installing widgets. In such cases, a new dashboard environment can be created using a dashboard assistant process. With a dashboard assistant, a user can build a custom dashboard environment by selecting a preexisting dashboard template and various dashboard properties or attributes, such as size, title, fonts, style, etc. The dashboard assistant can be, for example, an application that guides a user through set-op options and can be invoked manually through an icon or automatically in response to a trigger event (e.g., an attempt to install a widget with no preexisting dashboard environments).

A suitable template can be selected by a user manually based on its various properties and attributes (e.g., a game dashboard template). A template can also be selected automatically by an application, operating system and the like. Templates can be organized in a file system on a user device and/or on a remote server that is accessible by a device through a network connection. The templates can be organized for easy retrieval based on class, themes or any other selection criteria that is useful in distinguishing between dashboard environments. A search form can be provided by the dashboard assistant process to assist users in finding suitable templates based on one or more search criteria entered by the user.

The user can also specify one or more rules to be associated with a dashboard environment. These rules can be security rules that deny the installation of widgets which have certain properties (e.g., request access to system or network resources) or have been identified as "rogue" or "malicious." The user can also specify content rules for controlling content that is displayed or used by a widget (e.g., parental controls). Access rules can also be specified for determining who can install and use a widget or class of widgets in a particular dashboard environment. For example, an access rule may specify that only the owner of a device (e.g., a personal computer) can install widgets in a particular dashboard environment, while allowing guest log-ins of the device to create a temporary dashboard environment for temporarily installing widgets. If a guest log-in attempts to install a widget in an access-restricted dashboard environment, a dashboard assistant can be launched which invites the guest log-in to create and/or specify a temporary dashboard environment which is appropriate for a guest log-in (e.g. including restrictions on resource access).

In some implementations, a new dashboard environment can be created from a number of preexisting templates using a dashboard assistant process, which is described with respect to FIG. **11**.

Nested Dashboard Display Areas

FIG. **10** illustrates nested dashboard display areas **1004** and **1010**. In some implementations, the dashboard display areas **1004** and **1010** can be nested or stacked N layers deep on a user interface. In other implementations, the dashboard display areas **1004** and **1010** can be presented in a user interface as a linear sequence, as overlapping tiles, or on multiple surfaces of an animated two-dimensional or three-dimensional graphical object, as described with respect to FIGS. **12-14**.

In some implementations, a desktop **1000** includes a dashboard A icon **1002**. When the dashboard A icon **1002** is activated (e.g., clicked, mouse-over, etc.), the display area **1004** associated with a dashboard environment A is presented on the desktop **1000**. The display area **1004** includes one or more widgets **1006** and a dashboard B icon **1008**. When the dashboard B icon **1008** is activated, the display area **1010** associated with a dashboard environment B is presented, for example, within the display area **1004**. The display area **1010** includes one or more widgets **1012**.

In some implementations, the display area **1010** can be initially presented in the display area **1004** and then resized and/or moved anywhere on the desktop **1000** by a user or application. The display areas **1004** and **1010**, can include control and navigation mechanisms, as described with respect to FIG. **8**. The widgets **1006** and **1012** can be a member of the same widget class, a different widget class, or partially overlapping two or more widget classes. The display areas **1004** and **1010** can be displayed at the same time in a stack or cascade arrangement, or one at a time by hiding or obfuscating one of the display areas. Alternatively, a transition effect can be used to transition between the display areas **1004**, **1010**, whenever one of the display windows **1004**, **1010**, is activated (e.g., selected or focused upon by a user). For example, if a user clicks on the display area **1010**, the display area **1004** can become obfuscated (e.g., darkened, minimized, etc.) and vice-versa.

In some implementations, widgets **1006** in display area **1004** that are dragged and dropped into the display area **1010** will become part of the dashboard environment B, provided the widgets **1006** conform to any rules associated with the dashboard environment B. Similarly, widgets **1012** in display area **1010** that are dragged and dropped into the display area **1004** and will become part of the dashboard environment A, provided the widgets **1012** conform to any rules associated with the dashboard environment A. Widgets on the desktop **1000** (not shown) can also be dragged and dropped into the display areas **1004** and **1010**.

The use of nested display areas associated with different dashboard environments enables users to organize dashboards into hierarchies based on a user interests (e.g., entertainment, hobbies, sports, work, etc.) or other criteria. For example, a user can have a dashboard for entertainment-related widgets which are applicable to multiple types of entertainment, which can further include one or more nested dashboards including widgets that are specific to a particular form of entertainment (e.g., movies, books, etc.). In some

implementations, widgets can be automatically associated with nested dashboards without user interaction during download, installation, etc.

Multiple Dashboard Server Processes

FIG. **11** is a block diagram of a dashboard manager **1100** for managing various dashboard processes. The dashboard manager **1100** includes a display area manager **1102**, a dashboard installer **1104**, a widget installer **1106**, a rule manager **1108**, a dashboard assistant **1110** and a transition engine **1112**. In this particular implementation, the dashboard manager **1100** is shown as part of the dashboard server process **301**, as described with respect to FIG. **3**. Alternatively, one or more of the dashboard manager processes identified above, can be run outside the dashboard server process **301** by an operating system, application, plug-in, etc. The dashboard server **301**, dashboard clients **302** and widgets **300** are all described with respect to FIG. **3**.

Display Area Manager

The display area manager **1102** manages and presents display areas associated with dashboard environments in a user interface. The display area manager **1102** responds to input from control or navigation mechanisms, and handles communications between dashboard environments and with applications, operating system components, drivers, plug-ins, etc. For example, if a user moves a scroll bar in the display area, the display area manager **1102** determines which portion of the associated dashboard environment to display, and invokes the appropriate operating system processes and/or drivers to present the dashboard environment in the display area. In some implementations, the display area manager **1102** creates and maintains a list of widgets for each dashboard environment, which can be stored in, for example, the dashboard configuration information **304** and presented to the user.

Dashboard Installer

The dashboard installer **1104** is responsible for installing dashboard environments based on input received from the dashboard assistant **1110** or from another input source. The dashboard installer **1104** registers the dashboard environment with the operating system, so that other applications, operating system components and drivers, or other dashboard environments and/or widgets, can communicate with the newly installed dashboard environment.

In some implementations, an installer checklist is presented in a window, pane or other user interface, which includes a list of available dashboards for installation. A user can select one or more dashboards for installation by, for example, checking a "check box" or clicking a button displayed adjacent to the dashboard listing (or its associated icon) in the installer checklist. The number and types of dashboards (or various extensions or enhancements to dashboards) can be made available depending on the user and their privileges, interests, etc. In some implementations, during installation widgets can be automatically associated with dashboards based on the widget type or class, which can be defined by the widget author in a widget file or defined at a widget download site, etc.

Widget Installer

The widget installer **1106** is responsible for identifying widgets to be installed in a dashboard environment and for managing the installation of the widgets into the dashboard environment. In some implementations, the widget installer **1106** is capable of identifying a theme or class of a widget and selecting an appropriate preexisting dashboard environment for installation of the widget. If no preexisting dashboard environment is available, or there are no suitable preexisting dashboard environments to select from (e.g., no game oriented dashboard environment), then the widget installer **1106** invokes the dashboard assistant process **1110** to assist the user in creating a new dashboard environment.

Rule Manager

The rule manager **1108** enforces one or more rules related to widget and dashboard security, installation and access. For example, when the dashboard manager **1100** receives a security event, it invokes the rule manager **1008**. The rule manager **1108** assesses the security risk associated with the security event and initiates an appropriate security action based on the risk assessment, as described in co-pending U.S. Patent Application No. 60/730,956, entitled "Widget Security." For example, if a user attempts to install a "rogue" widget in a dashboard environment, a security event is generated by the operating system and detected by the dashboard manager **1100**. The rule manager **1108** assesses the risk of the event by, for example, determining whether the installation of the widget would violate any security rules. An example of a security rule would be if the widget to be installed/instantiated is on a "black list" of widgets, then the widget will not be installed in the dashboard environment. Such a "black list" could be downloaded from a trusted web site and stored locally as part of the dashboard configuration information **304** (see FIG. **3**). Another example of a security rule would be if the widget to be installed/instantiated is on a "white list" of widgets which are allowed to be installed in the dashboard environment.

The rule manager **1108** also enforces rules associated with widget installation. For example, if a widget does not belong to a particular widget class or theme (e.g., a game widget) associated with a dashboard environment, and an attempt to install the widget in the dashboard environment is detected, then the rule manager **1108** can initiate an appropriate action, such as preventing the installation of the widget in the dashboard environment and notifying the requesting user or application of the reasons for the action. If the widgets are already installed, then a security action could include denying certain administrative requests, such as a request to delete the widget from a dashboard environment.

The rule manager **1108** also enforces rules that restrict access to widgets in dashboard environments. For example, a dashboard environment may be associated with rules that prevent access to certain content from being displayed (e.g., parental controls) or prevent certain users from accessing and/or installing widgets in dashboard environments (e.g., guest log-ins). In some implementations, a dashboard is associated with privileges (e.g., read/write privileges). For example, a dashboard may only allow users with appropriate privileges to install widgets in the dashboard, or otherwise alter the dashboard, as oppose to other users who are permitted only to view widgets displayed in the dashboard.

Dashboard Assistant Process

The dashboard assistant process **1110** is used to create and install new dashboard environments. In some implementations, the process **1110** works with preexisting templates to create new dashboard environments, as described with respect to FIG. **8**.

Transition Engine

The transition engine **1112** is responsible for generating transition effects for transitions between two display areas associated with dashboard environments, as described with respect to FIG. **8**. When the dashboard manager **1100** receives a request to transition, it invokes the transition engine **1112**, which provides the desired transition effect (e.g., panning out, carousel, flip, peeling, etc.). In some implementations, the transition effect can be selected by a user via a preference pane or other user input mechanism. In other implementations, the transition is defined by the dashboard.

Dynamic Tiling

FIG. **12** illustrates a dynamic tiling scheme for multiple dashboards. In some implementations, multiple dashboards **1202***a-d* are presented in a user interface **1200** using a dynamic tiling scheme. In a multiple dashboard environment, it is possible for dashboards **1202***a-d* to have different sizes, numbers of widgets etc. Dynamic tiling enables the dashboards **1202***a-d* to be automatically resized based on the available space in the user interface **1200**. The dashboards **1202***a-d* can be presented in response to user input or programmatically through an operating system or application. For example, a user can press a key or key sequence which causes the dashboards **1202***a-d* to be simultaneously dynamically tiled in the user interface **1200**. Each dashboard is automatically resized to fit within the available space in the user interface **1200**. Widgets and other information and/or content in the dashboards **1202***a-d* can also be resized as appropriate.

In some implementations, when a user clicks on a dynamically tiled dashboard, the dashboard is activated and automatically resizes to fill a portion in the user interface **1200** or the entire user interface **1200**. The other dashboards in the user interface **1200** can remain on the desktop **1200** and/or be wholly or partially obfuscated (e.g., darkened, grayed out, blurred, etc.).

In some implementations, the user can drag a dashboard around the user interface **1200** and the other dashboards will automatically resize or move to make room for the dashboard at its new location in the user interface **1100**.

In some implementations, widgets can be dragged and dropped between dynamically tiled dashboards **1202***a-d*. When a widget is dropped into a dashboard it conforms to the dashboard's properties, theme or content and it is modified as appropriate to be consistent with other widgets in the dashboard (e.g., resized).

In some implementations, the currently activated dashboard is altered with animation or other special effects (e.g., highlighted, magnified, "fisheye" effect, etc.). In some implementations, the currently activated dashboard can have greater image resolution (e.g., more pixels) and/or more details than inactive dashboards. This feature enables users to move tiles around the user interface **1200** in real-time by reducing the amount of time required to draw and redraw a dashboard.

Tab Control

FIG. **13** illustrates a tab control scheme for multiple dashboards. In some implementations, multiple dashboards **1302** are presented in a user interface **1300** using a tab control scheme. A tab control **1302** can be used to organize multiple dashboards on the user interface **1300**. Each dashboard includes a tab **1304** and a tab panel **1306**. The tab **1304** is used to activate a dashboard and can be located on the top or sides of the tab control **1302**. When the tab **1304** is activated (e.g., mouse clicked by a user), the tab panel **1306** corresponding to the tab **1304** is moved to the front and activated. The tab panel **1306** can include one or more enabled widgets which can be interacted with by a user, application, etc.

In some implementations, the properties of the tab control **1302** (e.g., size, location, color, font, style) can be changed by a user or programmatically by an operating system and/or application. Each tab **1304** can be labeled with an appropriate title and other information indicative of the theme or content of the dashboard (e.g., a graphical image, etc.). The tab control **1304** can be minimized and stored in a configuration bar when not in use.

FIG. **14** illustrates a geometric scheme for organizing multiple dashboards on a user interface **1400**. In some implementations, a geometric object (e.g., a cube **1402**) can be used to organize multiple dashboards on the user interface **1400**. For example, a cube **1402** can display a dashboard or dashboard icon or other selectable object associated with a dashboard on the front-facing side of the cube **1402**. The user can manipulate a control mechanism **1404** (e.g., a scroll bar, key, mouse over, etc.) for controlling the animation of the cube **1402**. For example, with each quarter rotation the front-facing side of the cube **1402** displays a different dashboard icon, image or other dashboard indicia that can be static or have at least some portions animated. Thus, a user can quickly review available dashboards by "spinning" the cube about one of its axes. The user can also click a flip button **1406** to rotate or spin the cube to see another dashboard. By using animated two and three-dimensional graphical objects to display dashboards (e.g., like the cube **1402**), more than one dashboard can be visible to the user at a given time.

Other geographic objects can be used to display dashboards (e.g., a cylinder, sphere, triangle, diamond, etc.). When the user finds a desired dashboard, the user can select the dashboard for installation, previewing or launching by clicking on the dashboard icon, image or other dashboard indicia on the front-facing side of the cube **1402**.

Other types of organization schemes can also be used to organize multiple dashboards on a user interface. For example, a Rolodex graphic can be animated to simulate the functionality of a Rolodex by allowing the user to flip through multiple dashboards, i.e., index cards. Also, a carousel graphic can be animated to simulate the functionality of a carousel by allowing the user to manipulate (e.g., rotate) the graphic to reveal available dashboards.

Dashboard Configuration Bar

FIG. **15** illustrates an exemplary dashboard configuration bar. In some implementations, dashboards can be organized in a dashboard configuration bar **1504** displayed in a user interface **1500**. A user can launch and/or display a dashboard **1502** ("Dashboard B") by selecting an icon **1506** associated with the dashboard **1502** from the dashboard configuration bar **1504** and dropping the icon **1506** in the user interface **1500**. When the icon **1506** is clicked or dragged and dropped in the user interface **1500**, the dashboard **1502** is displayed, as shown in FIG. **15**. If multiple dashboard and/or widgets are dropped in the user interface **1500**, then in some implementations the dashboards and/or widgets can be dynamically tiled, tabbed or otherwise organized for maximum visibility depending on the display environment and user preferences. Such organization can include replacing existing dashboards or partially overlapping existing dashboards. In some implementations, when a user traverses the icon **1506** with a cursor (e.g., a mouse over), a panel **1508** or bubble is displayed

proximate the icon **1506** which lists the widgets or any other desired information (e.g., descriptive text, images, etc.) in the dashboard **1502**. Alternatively, when a user traverses over different dashboard icons **1506** in the dashboard configuration bar **1504** the dashboards are switched in and out of operation. In some implementations, dashboard icons can be organized in the dashboard configuration bar **1504** based on dashboard type or class and one or more filter buttons (not shown) can be provided for filtering out dashboards from being displayed in the dashboard configuration bar **1504** based on one or more filter criteria.

Dashboard/Widget Configuration Bar

FIG. **16** illustrates an exemplary dashboard/widget configuration bar. In some implementations, dashboards and widgets can be organized together in a dashboard/widget configuration bar **1604** displayed in a user interface **1600**. A user can launch and/or display a dashboard **1602** ("Dashboard B") by clicking an icon **1606** associated with the dashboard **1602** from the dashboard/widget configuration bar **1604** or dragging the icon **1606** from the dashboard/widget configuration bar **1604** and dropping the icon **1606** in the user interface **1602**, as previously described with respect to FIG. **15**. Additionally, a user can launch and/or display a widget **1608** ("Widget A") by selecting an icon **1610** associated with the widget **1608** from the dashboard/widget configuration bar **1604** and dropping the icon **1610** in the user interface **1600**. The widget **1608** can be dropped into a user interface **1600** (as shown) or into a dashboard. The widget **1608** can also be dragged and dropped into the dashboard **1602**. If multiple dashboard and/or widgets are dropped in the user interface **1600** or dashboard layer, then in some implementations the dashboards and/or widgets can be dynamically tiled, tabbed or otherwise organized for maximum visibility depending on the display environment and user preferences. In some implementations, dashboard and/or widget icons can be organized in the widget/dashboard configuration bar **1604** based on dashboard or widget type or class and one or more filter buttons (not shown) can be provided for filtering out dashboards or widgets from being displayed in the dashboard configuration bar **1604** based on one or more filter criteria.

Dashboard Menu Scheme

FIG. **17** illustrates an exemplary menu scheme for organizing multiple dashboards and widgets. In some implementations, a user can select among multiple dashboards and/or widgets using a pull-down menu **1704**. The menu **1704** can be accessed from a tool bar **1701** in a user interface **1700** or any other suitable location in the user interface **1700** or a dashboard layer. The user can navigate through a hierarchy of dashboards and/or widgets using a pointing device. In some implementations, when the pointing device (e.g., a cursor) traverses a dashboard in the menu **1704**, the contents of the dashboard are displayed. In the example shown, the dashboard E-**1** **1702** has been selected by a user, and the contents of Dashboard E-**1** **1702** (i.e., Widget A, Widget B) are displayed. Note that the dashboard E-**1** **1702** is a nested dashboard, as described with respect to FIG. **10**. If multiple dashboard and/or widgets are dropped in the user interface **1700** or a dashboard layer, then in some implementations the dashboards and/or widgets can be dynamically tiled, tabbed or otherwise organized for maximum visibility depending on the display environment and user preferences. In some implementations, when a user navigates the menu **1704** the dashboard being traversed is displayed in the user interface **1700** or in a separate window or pane, so that the user can see the contents of the dashboard.

Any dashboard that has been opened from the display can be closed using a variety of techniques include buttons, selecting a close option from a pull-down menu.

Dashboard Tool Panel Scheme

FIG. **18** illustrates an exemplary tool panel scheme for launching/displaying dashboards and/or widgets. In some implementations, the user can invoke a tool panel **1802** having a display area **1804** in a user interface **1800**. For example, the user can invoke the tool panel **1802** with the display area **1804** by selecting a button **1803** or other input mechanism in a tool bar **1801**. In response to the selection, the tool panel **1802** and display area **1804** are presented on the user interface **1800**. A user can click a dashboard and/or widget icon **1810**, or drag a dashboard and/or widget icon **1810** from the tool panel **1802** and drop it in the display area **1804**, which causes the dashboard and/or widget to be launched and/or displayed. For example, a dashboard icon **1810** associated with a dashboard **1806** ("Dashboard A") can be selected, dragged and dropped in the display area **1804**. The dashboard **1806** is displayed together with any widgets associated with the dashboard **1806**. When the user navigates the icons **1810** in the tool panel **1802**, the icons can be **1810** altered or animated (e.g., fisheye magnified) to indicate to the user which icon **1810** has been selected. In some implementations, the icons **1810** can be organized in the tool panel **1802** based on dashboard or widget type or class and filters can be applied based on one or more filter criteria. If multiple dashboard and/or widgets are dropped in the display area **1804**, then in some implementations the dashboards and/or widgets can be dynamically tiled, tabbed or otherwise organized for maximum visibility depending on the display environment and user preferences.

Dashboard Data Structure

In some implementations, each dashboard in a multiple dashboard configuration is associated with metadata which can be used to manage the dashboard and associated widgets. The data structure can be initialized when a dashboard is first installed. After installation, a dashboard data structure can be periodically updated as it is reconfigured (e.g., widgets are added or deleted).

Table II below is exemplary data structure for multiple dashboards.

TABLE I

Exemplary Dashboard Data Structure

Dashboard Name	Identifier (static, dynamic)	Parent Dashboard	Int. Links (widgets or dbs)	Ext. Links (e.g., URLs)	Rules (e.g., security)
A	32831223			Apple.com	
B	43443343		A		
B-1	34343444	E	A, B		read only
...	...	...	...	...	...

Referring to Table I, an exemplary data structure for a multiple dashboard environment is described. In this example there are three dashboards A, B and B-**1**. Dashboard B-**1** is nested with dashboard B. Each dashboard is associated with a unique static identifier (ID) and/or dynamic identifier (e.g., hashes). The static identifier can be used to identify the original instance of a dashboard. Dynamic identifiers can be used to identify subsequent instances of a dashboard. If the dashboard is nested in a parent dashboard, then the name or identifier for the parent dashboard is stored in the data structure. Each dashboard and/or its associated widgets can be internally linked to other widgets or dashboards. These link relationships are stored in the data structure. Each dashboard and/or its associated widgets can be externally linked to sources outside the dashboard display environment, such as web site or other network resource. A URL or other resource locator mechanism can be stored in the data structure. Any rules applying to a dashboard or an associated widget can be stored in the data structure, including but not limited to security rules relating to authentication, access, etc.). Various other metadata can be stored in the dashboard data structure, including but not limited to: metadata associated with the display of a dashboard or an associated widget (e.g., size, position, font, style, etc.). The dashboard data structures can be stored locally in any suitable computer-readable medium, such as memory, a hard disk and the like.

In the above description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the invention. It will be apparent, however, to one skilled in the art that the invention can be practiced without these specific details. In other instances, structures and devices are shown in block diagram form in order to avoid obscuring the invention.

In particular, one skilled in the art will recognize that other architectures and graphics environments may be used, and that the present invention can be implemented using graphics tools and products other than those described above. In particular, the client/server approach is merely one example of an architecture for providing the dashboard functionality of the present invention; one skilled in the art will recognize that other, non-client/server approaches can also be used.

Some portions of the detailed description are presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the discussion, it is appreciated that throughout the description, discussions utilizing terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

The present invention also relates to an apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general-purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus.

The algorithms and modules presented herein are not inherently related to any particular computer or other apparatus. Various general-purpose systems may be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatuses to perform the method steps. The required structure for a variety of these systems will appear from the description below. In addition, the present invention is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the invention as described herein. Furthermore, as will be apparent to one of ordinary skill in the relevant art, the modules, features, attributes, methodologies, and other aspects of the invention can be implemented as software, hardware, firmware or any combination of the three. Of course, wherever a component of the present invention is implemented as software, the component can be implemented as a standalone program, as part of a larger program, as a plurality of separate programs, as a statically or dynamically linked library, as a kernel loadable module, as a device driver, and/or in every and any other way known now or in the future to those of skill in the art of

computer programming. Additionally, the present invention is in no way limited to implementation in any specific operating system or environment.

It will be understood by those skilled in the relevant art that the above-described implementations are merely exemplary, and many changes can be made without departing from the true spirit and scope of the present invention. Therefore, it is intended by the appended claims to cover all such changes and modifications that come within the true spirit and scope of this invention.

What is claimed is:

1. A method, comprising:

providing a first dashboard layer including one or more first widgets;

providing a second dashboard layer including one or more second widgets, the second dashboard layer being distinct from the first dashboard layer, the first and second dashboard layers each being selectably displayed as an overlay to a desktop user interface; and

providing a transition for use when transitioning between the first dashboard layer and the second dashboard layer, wherein the desktop user interface is inactivated such that visible elements on the desktop user interface cannot be interacted with while the first or second dashboard layer is displayed, and wherein a visual effect indicates that the desktop user interface is inactivated.

2. A system comprising:

one or more processors configured to perform operations for generating a user interface, the user interface comprising:

a first display area associated with a first dashboard environment and configured for displaying at least one widget from a first set of widgets; and

a second display area associated with a second dashboard environment and configured for displaying at least one widget from a second set of widgets where the first display area and the second display area are distinct layers selectably and independently displayed over a desktop user interface, where display of either the first display area or the second display area includes presenting a visual effect to indicate that visible portions of the desktop user interface are inactive.

3. The system of claim **2**, wherein at least one widget is in the first and second sets of widgets.

4. The system of claim **2**, further comprising:

a transition engine configured for transitioning from the first display area to the second display area.

5. The system of claim **4**, wherein the transition occurs without closing or hiding the first display area.

6. A method comprising:

identifying a widget for installation in a dashboard environment;

selecting the dashboard environment from a number of dashboard environments, each dashboard environment having a layer relative to a desktop and each configured to be separately or concurrently displayed over the desktop in response to a selection and where the desktop is inactivated such that visible elements on the desktop cannot be interacted with when the selected dashboard environment is displayed; and

installing the widget in the selected dashboard environment.

7. The method of claim **6**, wherein selecting a dashboard environment includes:

evaluating the widget to determine a theme associated with the widget;

selecting a dashboard environment based on the theme; and

installing the widget in the selected dashboard environment.

8. The method of claim **6**, wherein the selecting includes receiving a user selection of the dashboard environment for installing the widget.

9. The method of claim **6**, wherein the selecting includes inferring the dashboard environment to install the widget on.

10. A system, comprising:

a processor operable to interact with a user interface to provide:

a first dashboard environment configured to be invoked from the user interface; and

a second dashboard environment configured to be invoked from the first dashboard environment,

where each dashboard environment includes a layer relative to a desktop and being separately displayable over the desktop and where the desktop is inactivated such that visible elements on the desktop cannot be interacted with when the selected dashboard environment is displayed and wherein a visual effect indicates that the desktop is inactivated.

11. The system of claim **10**, wherein the second dashboard environment is configured to be invoked from a display area associated with the first dashboard environment.

12. A method comprising:

defining a first dashboard environment configured to be invoked from a desktop user interface; and

defining a second dashboard environment configured to be invoked from the first dashboard environment,

where each dashboard environment includes a layer relative to a desktop and being separately displayable over the desktop user interface, where display of either the first dashboard environment or the second dashboard environment includes presenting a visual effect to indicate that visible portions of the desktop user interface are inactive.

13. The method of claim **12**, further comprising managing a transition between a first display area associated with the first dashboard environment and a second display area associated with the second dashboard environment, including selecting a transition between the two.

14. A computer program tangibly embodied on a volatile or non-volatile medium including instructions, which, when executed by a processor, causes the processor to perform the operations of:

identifying a widget for installation in a dashboard environment;

selecting the dashboard environment from at least two dashboard environments, each dashboard environment having a layer relative to a desktop and each configured to be separately or concurrently displayed over the desktop in response to a selection and where the desktop is inactivated such that visible elements on the desktop cannot be interacted with when the selected dashboard is displayed; and

installing the widget in the selected dashboard environment.

15. The computer program of claim **14**, wherein selecting a dashboard environment includes:

evaluating the widget to determine a theme associated with the widget;

selecting a dashboard environment based on the theme; and

installing the widget in the selected dashboard environment.

16. The computer program of claim **14**, wherein determining includes receiving a user selection of the dashboard environment for installing the widget.

17. The computer program of claim 14, wherein determining includes inferring the dashboard environment to install the widget on.

18. A system for displaying widgets in multiple dashboard environments, comprising:

a processor;

a computer-readable medium coupled to the processor and having instructions contained thereon, which, when executed by the processor, causes the processor to perform the operations of:

identifying a widget for installation in a dashboard environment;

selecting the dashboard environment from at least two dashboard environments, each dashboard environment having a layer relative to a desktop and each configured to be separately or concurrently displayed being separately displayed over the desktop in response to a selection and where the desktop is inactivated such that visible elements on the desktop cannot be interacted with when the selected dashboard environment is displayed; and

installing the widget in the selected dashboard environment.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,954,064 B2
APPLICATION NO. : 11/346603
DATED : May 31, 2011
INVENTOR(S) : Scott Forstall et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On Title page 4, item [56]; in column 1, under "Other Publications", line 15, delete "archivve.org" and insert -- archive.org --, therefor.

On Title page 4, item [56]; in column 1, under "Other Publications", line 17, delete "archivve.org" and insert -- archive.org --, therefor.

On Title page 4, item [56]; in column 2, under "Other Publications", line 26, delete "Writen" and insert -- Written --, therefor.

On Title page 5, item [56]; in column 1, under "Other Publications", line 21, delete "Comarison" and insert -- Comparison --, therefor.

On Title page 5, item [56]; in column 1, under "Other Publications", line 48, delete "Interent" and insert -- Internet --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 6, delete "Mutli-Touch" and insert -- Multi-Touch --, therefor.

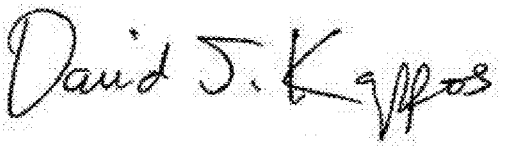
On Title page 5, item [56]; in column 2, under "Other Publications", line 13, delete "Intrenational" and insert -- International --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 17, delete "Intrenational" and insert -- International --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 50, delete "Partial Interntional" and insert -- Partial International --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 50, delete "Rpeort" and insert -- Report --, therefor.

Signed and Sealed this
Tenth Day of January, 2012



David J. Kappos
Director of the United States Patent and Trademark Office

On Title page 5, item [56]; in column 2, under "Other Publications", line 51, delete "Interntional" and insert -- International --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 60, delete "Busieness" and insert -- Business --, therefor.

On Title page 5, item [56]; in column 2, under "Other Publications", line 65, delete "Archieved" and insert -- Archived --, therefor.

On Title page 6, item [56]; in column 2, under "Other Publications", line 5, delete "widipedia" and insert -- wikipedia --, therefor.

In column 4, line 11, after "bar" insert -- . --.

In column 14, line 7, delete "FIG. 41" and insert -- FIG. 4f --, therefor.

In column 18, line 1, delete "the a" and insert -- the --, therefor.

In column 36, line 5, in claim 18, before "over" delete "being separately displayed".